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TRANSACTIONS

OF THE

COLLEGE OF PHYSICIANS

OF

PHILADELPHIA.

THIRD SERIES.

VOLUME THE TWENTY-NINTH.

PHILADELPHIA:
PRINTED FOR THE COLLEGE.
1907.

NOTICE.

The present volume of TRANSACTIONS contains the papers read before the College from January, 1907, to December, 1907, inclusive.

The Committee of Publication thinks it proper to say that the College holds itself in no way responsible for the statements, reasonings, or opinions set forth in the various papers published in its TRANSACTIONS.

EDITED BY

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DORNAN, PRINTER.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

1907.

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† Died, March 18, 1907.
‡ Elected Chairman, March 26, 1907.
§ Elected, October 2, 1907.

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* Created by Amendment to Ordinances and By-laws adopted October 2, 1907. Committee appointed November 6, 1907.

LIST

OF THE

PRESIDENTS OF THE COLLEGE FROM THE TIME OF ITS INSTITUTION.

ELECTED	
1787	JOHN REDMAN
1805	WILLIAM SHIPPEN
1809	ADAM KUHN
1818	THOMAS PARKE
1835	THOMAS C. JAMES*
1835	THOMAS T. HEWSON
1848	GEORGE B. WOOD
1879	W. S. W. RUSCHENBERGER
1883	ALFRED STILLÉ
1884	SAMUEL LEWIS†
1884	J. M. DA COSTA
1886	S WEIR MITCHELL
1889	D. HAYES AGNEW
1892	S. WEIR MITCHELL
1895	J. M. DA COSTA
1898	JOHN ASHHURST, JR.
1900	W. W. KEEN
1902	HORATIO C. WOOD
1904	ARTHUR V. MEIGS
1907	JAMES TYSON

* Died four months after his election.
† Resigned on account of ill-health.

FELLOWS

OF THE

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

DECEMBER, 1907.

* Non-resident Fellows.
† Fellows who have commuted dues

ELECTED

*1883. Abbot, Griffith E., Ph.D., M.D. Leominster, Mass.

1892. Abbott, Alex. C., M.D., Professor of Hygiene and Bacteriology, and Director of the Laboratory of Hygiene in the University of Pennsylvania. 4229 Baltimore Ave.

1905. Adler, Lewis H., Jr., M.D., Professor of Diseases of the Rectum in the Philadelphia Polyclinic and College for Graduates in Medicine; Prosector to the Professor of Anatomy in the University of Pennsylvania; Consulting Surgeon to the Charity Hospital. 1610 Arch St.

1903. Allen, Alfred Reginald, M.D. 111 S. Twenty-first St.

1906. Allen, Francis Olcott, Jr., A.B., M.D., Surgeon to the Dispensary of the Presbyterian Hospital; Surgeon to the Dispensary of the Methodist Episcopal Hospital. 323 S. Sixteenth St.

1896. Allyn, Herman B., M.D., Associate in Medicine in the University of Pennsylvania; Physician to the Philadelphia Hospital. 501 S. Forty-second St.

1888. Anders, James M., M.D., LL.D., Professor of the Theory and Practice of Medicine and Clinical Medicine in the Medico-Chirurgical College; Consulting Physician to the Jewish Hospital Association, Philadelphia. 1605 Walnut St.

1869. Andrews, T. Hollingsworth, M.D. 1119 Spruce St.

1905. Anspach, Brooke M., M.D., Gynecologist and Obstetrician to the Philadelphia Hospital; Assistant Gynecologist to the University Hospital; Instructor in Gynecology in the Uni-

ELECTED

versity of Pennsylvania; Pathologist to the Kensington Hospital for Women. 1819 Chestnut St.

1905. Appleman, Leighton F., M.D., Demonstrator of Pharmacy and Materia Medica, and Instructor in Therapeutics in the Jefferson Medical College; Instructor in Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmologist to the Frederick Douglass Memorial Hospital. 308 S. Sixteenth St.

*1882. Ashbridge, Richard, M.D. West Whiteland, Pa.

1906. Ashhurst, Astley P. C., A.B., M.D., Surgeon to the Dispensary of the Episcopal and of the Children's Hospitals; Assistant Surgeon to the Orthopædic Hospital; Chief of the Gynecological Dispensary of the Pennsylvania Hospital; Prosector to the Associate Professor of Applied Anatomy in the University of Pennsylvania. 2000 De Lancey Place.

1893. Ashton, Thomas G., M.D., Adjunct Professor of Medicine in the University of Pennsylvania; Physician to the Philadelphia Hospital. 1814 S. Rittenhouse Square.

1857. Atlee, Walter Franklin, A.M., M.D., Corresponding Member of La Société des Sciences Médicales de Lyons; Consulting Surgeon to St. Luke's Hospital, Bethlehem; Visiting Physician to the Preston Retreat. 210 S. Thirteenth St.

1906. Babbitt, James A., A.B. (Yale), A.M. (Haverford), M.D., Laryngologist to the Dispensary of the Children's Hospital; Instructor in Laryngology and Rhinology in the Philadelphia Polyclinic; Physical Director and Associate Professor of Physiology at Haverford College; Medical Examiner at Haverford School. 121 S. Eighteenth St.

1852. Bache, Thomas Hewson, M.D. 233 S. Thirteenth St

1903. Bacon, John, M.D. Torresdale, Pa.

†1892. Baker, George Fales, B.S., M.D. 1818 Spruce St.

1889. Baldy, John Montgomery, M.D., Professor of Gynecology in the Philadelphia Polyclinic; Surgeon to the Gynecean Hospital and to the Gynecological Out-patient Department of the Pennsylvania Hospital; Consulting Surgeon to the Frederick Douglass Memorial Hospital. 2219 De Lancey Place.

1898. Balliet, Tilghman M., A.M., M.D., Professor of Therapeutics at Dartmouth College, Hanover, N. H.; Physician to the Old Man's Home. 3709 Powelton Ave.

ELECTED

1883. Baum, Charles, A.M., M.D., Ph.D. 1828 Wallace St.

1883. Beates, Henry, M.D. 260 S. Sixteenth St.

1860. Benner, Henry D., M.D. Broad and Dickinson Sts.

1874. Bennett, W. H., A.M., M.D., Physician-in-Charge of the Seashore House for Invalid Children, and of the Seaside House for Invalid Women, Atlantic City; formerly Physician to the Episcopal Hospital, and Physician-in-Charge of St. Christopher's Hospital for Children. 1837 Chestnut St.

1896. Beyea, Henry D., M.D., Associate in Gynecology and Assistant Demonstrator of Obstetrics in the University of Pennsylvania; Assistant Surgeon to the Gynecean Hospital. 1734 Spruce St.

†1884. Biddle, Alexander W., M.D. Chestnut Hill.

1884. Biddle, Thomas, M.D. 122 S. Twenty-second St.

*1903. Biggs, Montgomery H., M.D. Rutherfordton, N. C.

1904. Birney, Herman H., M.D. 4016 Chestnut St.

*1866. Black, John Janvier, A.M. (Princeton), M.D. New Castle, Delaware.

1894. Bliss, Arthur Ames, M.D., Laryngologist and Aurist to the German Hospital; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb. 117 S. Twentieth St.

1894. Bochroch, Max H., M.D., Demonstrator of Neurology and Chief Clinical Assistant in the Nervous Department of the Jefferson Medical College Hospital; Neurologist to the Out-patient Department of St. Joseph's Hospital. 937 N. Eighth St.

1896. Boger, John A., A.M., M.D., Surgeon to St. Mary's Hospital; Surgeon to the Stetson Hospital; Surgeon to the Dispensary of the Episcopal Hospital. 2213 N. Broad St.

1891. Boyd, George M., M.D., Professor of Clinical Obstetrics in the Medico-Chirurgical College; Obstetrician to the Medico-Chirurgical Hospital; Physician to the Philadelphia Lying-in Charity; Obstetrician and Gynecologist to the Philadelphia Hospital. 1909 Spruce St.

1907. Boyer, Henry Percival, M.D., Physician to the Stetson Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases. 4602 Baltimore Ave.

†1884. Bradford, T. Hewson, M.D., Medical Director of the Philadelphia Life Insurance Company; Medical Director of the United Security Life Insurance and Trust Company;

ELECTED

Attending Physician to St. Martin's College for Destitute Boys. 125 S. Eighteenth St.

1907. Bradley, William N., Ph.G., M.D., Assistant Physician to the Medical Dispensary of the Children's Hospital; Assistant Physician to the Children's Out-patient Department of the Jefferson Medical College Hospital; Instructor in Pediatrics in Jefferson Medical College. 1532 S. Sixth St.

1903. Branson, Thomas F., M.D., Attending Physician to the Bryn Mawr Hospital. Rosemont, Pa.

1891. Brinton, Lewis, M.D., Chief Physician to the American Hospital for Diseases of the Stomach. 802 N. Broad St.

1900. Brinton, Ward, M.D., Demonstrator of Physical Diagnosis in the Jefferson Medical College; Assistant in the Medical Dispensary of Jefferson Medical College Hospital. 1423 Spruce St.

1907. Brooks, Macy, A.B. (Princeton), M.D., Surgeon-in-Charge of the Surgical Dispensary of the University Hospital; Assistant Genito-urinary Surgeon to the Philadelphia Hospital; Surgeon to the Dispensary of the Howard Hospital. 322 S. Fifteenth St.

1887. Brubaker, Albert P., M.D., Professor of Physiology in the Pennsylvania College of Dental Surgery; Adjunct Professor of Physiology and Hygiene in the Jefferson Medical College; Lecturer on Anatomy and Physiology in the Drexel Institute. 105 N. Thirty-fourth St.

*1890. Brush, Edward N., M.D., Medical Superintendent of the Shepherd and Enoch Pratt Hospital. Station A, Baltimore, Md.

*1851. Bullock, William R., M.D. Tenth and Washington Sts., Wilmington, Del.

1906. Burns, Stillwell C., M.D., Lecturer on Surgery in the Medico-Chirurgical College; Assistant Surgeon to the Medico-Chirurgical Hospital. 1326 Spring Garden St.

1892. Burr, Charles W., M.D., Professor of Mental Diseases in the University of Pennsylvania; Neurologist to the Philadelphia Hospital. 1327 Spruce St.

1906. Butler, Ralph, M.D., Chief of the Dispensary for Diseases of the Ear at the University Hospital; Chief of the Dispensary for Diseases of the Ear, Nose, and Throat at the German Hospital; Assistant Laryngologist to the Philadelphia Hospital; Associate in Otology in the Philadelphia Polyclinic. 1824 Chestnut St.

ELECTED

†1907. Cadwalader, Williams B., M.D., Pathologist and Clinical Assistant to the Orthopædic Hospital and Infirmary for Nervous Diseases; Assistant Instructor in Nervous Diseases in the Philadelphia Polyclinic. 1710 Locust St.

1905. Cameron, George A., M.D., Physician to the Germantown Hospital. S. E. cor. School House Lane and Greene St., Germantown.

1905. Carmany, Harry S., M.D., Surgeon to St. Timothy's Hospital, Roxborough; Surgeon to the Dispensary of the Episcopal Hospital. 366 Green Lane, Roxborough.

1905. Carpenter, Herbert B., M.D., Physician to the Dispensary of the Children's Hospital. 1805 Spruce St.

1895. Carpenter, John T., M.D., Lecturer on Ophthalmology in the University of Pennsylvania; Assistant Ophthalmic Surgeon to the University Hospital; Attending Ophthalmologist to the Bryn Mawr Hospital. 1624 Walnut St.

*1897. Carter, William S., M.D., Professor of Physiology in the University of Texas. Galveston, Texas.

1892. Cattell, Henry W., A.M., M.D., Editor of *Medical Notes and Queries;* Author of *Postmortem Pathology;* American Editor and Translator of Ziegler's *Special Pathological Anatomy;* Editor of Lippincott's *Medical Dictionary.* 3709 Spruce St.

*1892. Cerna, David, M.D., Ph.D., Corresponding Fellow of the Sociedad Española de Higiene of Madrid. Monclova, Coah, Mexico.

1900. Chance, Burton, M.D., Assistant Surgeon to the Wills Eye Hospital; Ophthalmologist to the Germantown Dispensary and Hospital. 235 S. Thirteenth St.

1885. Chapin, John B., M.D., LL.D. (Jefferson and Williams), Physician-in-Chief to the Pennsylvania Hospital for the Insane. Pennsylvania Hospital for the Insane.

1880. Chapman, Henry C., M.D., Professor of the Institutes of Medicine and of Medical Jurisprudence in the Jefferson Medical College. 2047 Walnut St.

1900. Chase, Robert Howland, A.M., M.D., Superintendent of the Friends' Asylum for the Insane. Friends' Asylum, Frankford.

*1868. Cheston, D. Murray, M.D. Harwood P. O., Md.

1897. Cheston, Radcliffe, M.D., Visiting Physician to the Chestnut Hill Hospital; Consulting Physician to the Germantown

ELECTED

Hospital and to the Pennsylvania Institution for the Deaf and Dumb. Chestnut Hill.

1904. Christian, Hilary M., M.D., Clinical Professor of Genito-Urinary Diseases in the Medico-Chirurgical College; Professor of Genito-Urinary Diseases in the Philadelphia Polyclinic. 1344 Spruce St.

1903. Chrystie, Walter, M.D. Bryn Mawr, Pa.

1899. Clark, John G., M.D., Professor of Gynecology in the University of Pennsylvania; Gynecologist-in-Chief to the University Hospital. 2017 Walnut St.

1897. Claxton, Charles, A.M., M.D. 5137 Morris St., Germantown.

1872. Cleemann, Richard A., M.D. 2135 Spruce St.

1896. Cleveland, Arthur H., M.D., Clinical Professor of Laryngology in the Medico-Chirurgical College; Laryngologist to the Medico-Chirurgical Hospital; Laryngologist and Aurist to the Presbyterian Hospital, and to the Pennsylvania Institution for the Deaf and Dumb. 256 S. Fifteenth St.

1903. Coates, George Morrison, A.B., M.D., Associate Professor of Diseases of the Nose and Throat in the Philadelphia Polyclinic; Laryngologist to the Henry Phipps Institute for Tuberculosis; Laryngologist to the Pennsylvania Institution for the Instruction of the Blind; Assistant Laryngologist to St. Vincent's Home. 334 S. Nineteenth Street.

1907. Cohen, Myer Solis, A.B., M.D., Visiting Physician to the Hospital for Diseases of the Lungs, Chestnut Hill; Assistant Physician to the Philadelphia Hospital; Pediatrician to the Dispensary of the Jewish Hospital; Assistant Physician to the Medical Dispensary of the University Hospital. 4110 Parkside Ave.

1888. Cohen, Solomon Solis, M.D., Professor of Clinical Medicine in the Jefferson Medical College; Physician to the Jefferson Medical College Hospital, to the Philadelphia Hospital, to the Jewish Hospital, and to the Rush Hospital. 1525 Walnut St.

1898. Coles, Stricker, M.D., Demonstrator and Clinical Lecturer on Obstetrics in the Jefferson Medical College; Assistant Obstetrician to the Jefferson Maternity. 249 S. Fifteenth Street.

1901. Coley, Thomas Luther, A.B., M.D., Attending Physician to the Methodist Episcopal Hospital of Philadelphia. 257 S. Twenty-first St.

ELECTED

1903. Cooper, J. Cardeen, M.D., Consulting Physician to the Methodist Home for the Aged. 1016 Lehigh Ave.

1903. Coplin, W. M. L., M.D., Professor of Pathology in the Jefferson Medical College; Pathologist to and Director of the Laboratories of the Jefferson Medical College Hospital; Pathologist to the Philadelphia Hospital and to the Friends' Asylum for the Insane, Frankford; Bacteriologist to the Pennsylvania State Board of Health. 1529 S. Broad St.

1907. Council, Malcolm S., M.D., Attending Physician to the Bryn Mawr Hospital; Attending Physician to the Cathcart Home at Devon. Bryn Mawr, Pa.

1904. Craig, Frank A., M.D., Assistant Instructor in Medicine in the University of Pennsylvania; Member of Staff of the Henry Phipps Institute; Examining Physician to the Free Hospital for Poor Consumptives. 732 Pine St.

1907. Crampton, George S., M.D. 251 S. Seventeenth St.

1895. Cross, William A., M.D., Consulting Physician to the Jewish Hospital. Jenkintown, Pa.

1904. Cruice, John M., M.D., Instructor in Medicine in the University of Pennsylvania; Assistant Physician to the Philadelphia Hospital; Physician to the Medical Dispensary of the University Hospital and of St. Joseph's Hospital. 1815 Spruce St.

1902. Currie, Charles A., M.D., Physician to the Germantown Hospital. West Walnut Lane, Germantown.

1884. Curtin, Roland Gideon, A.M., M.D., Ph.D., Ex-President of the American Climatological Association; Ex-President of the American Society of Tropical Medicine; Ex-President of the Philadelphia County Medical Society; Ex-President of the Philadelphia Medical Club. 22 S. Eighteenth St.

1884. Da Costa, John C., M.D., Emeritus Gynecologist to the Jefferson Medical College Hospital; Consulting Gynecologist to St. Agnes's Hospital. 1022 Spruce St.

1903. Da Costa, John C., Jr., M.D., Demonstrator of Clinical Medicine in the Jefferson Medical College; Chief of the Medical Clinic in the Jefferson Medical College Hospital; Assistant Physician to the Philadelphia Hospital; Hematologist to the German Hospital. 1022 Spruce St.

1896. Da Costa, John Chalmers, M.D., Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical

ELECTED

College; Surgeon to the Philadelphia and to St. Joseph's Hospitals. 2045 Walnut St.

1887. Daland, Judson, M.D., Professor of Clinical Medicine in the Medico-Chirurgical College; Physician to the Medico-Chirurgical Hospital; Consulting Physician to the Kensington Hospital for Women; Consulting Physician to the State Hospital for the Insane at Norristown. 317 S. Eighteenth St.

1859. Darrach, James, M.D., Consulting Surgeon to the Germantown Hospital. 5923 Greene St., Germantown.

1896. Davis, Charles N., M.D., Dermatologist to the Pennsylvania Hospital; Consulting Dermatologist to St. Agnes's Hospital; Assistant Physician to the Dispensary for Skin Diseases in the Howard Hospital. 1931 Spruce St.

1888. Davis, Edward P., A.M., M.D., Professor of Obstetrics in the Jefferson Medical College and in the Philadelphia Polyclinic; Visiting Obstetrician to the Jefferson and to the Polyclinic Hospitals; Obstetrician and Gynecologist to the Philadelphia Hospital; Member of the American Gynecological Society, the American Pediatric Society, and of the International Cóngress of Obstetrics and Gynecology. 250 S. Twenty-first St.

1889. Davis, Gwilym G., M.D. (Univ. of Penna. and Göttingen). M.R.C.S. England, Associate Professor of Applied Anatomy in the University of Pennsylvania; Surgeon to the Episcopal, to St. Joseph's, and to the Orthopædic Hospitals. 1814 Spruce St.

1900. Davisson, Alex. Heron, M.D. 31 St. Paul's Road, Ardmore.

1894. Deaver, Harry C., M.D., Surgeon to the Episcopal and to the Stetson Hospitals, to St. Christopher's Hospital for Children, and to the Children's Hospital of the Mary J. Drexel Home. 1534 N. Fifteenth St.

1887. Deaver, John B., M.D., Surgeon-in-Chief to the German Hospital; Consulting Surgeon to the Germantown Hospital. 1634 Walnut St.

1892. Deaver, Richard Wilmot, M.D., Consulting Surgeon to the Germantown Hospital. 6105 Main St., Germantown.

1902. Dehoney, Howard, M.D. 237 S. Thirteenth St.

1885. Dercum, Francis X., M.D., Professor of Nervous and Mental Diseases in the Jefferson Medical College; Neurologist to the Philadelphia Hospital; Consulting Neurologist to

ELECTED

St. Agnes's and to the Jewish Hospitals, and to the State Asylum for the Chronic Insane of Pennsylvania. 1719 Walnut St.

1891. Dixon, Samuel G., M.D., President and Executive Curator of the Academy of Natural Sciences of Philadelphia; Member of the Council of the American Philosophical Society; Member of the Board of Trustees of the Wistar Institute of Anatomy; Member of the Board of Managers of the Philadelphia Zoölogical Society. Ardmore, Pa.

*1896. Donnellan, P. S., M.D., L.R.C.S. and P., Ireland. Coronado Beach, Cal.

1897. Dorland, W. A. Newman, M.D., Associate in Gynecology in the Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Instructor in Obstetrics in the University of Pennsylvania. 1623 Walnut St.

1907. Dorrance, George Morris, M.D., Assistant Surgeon to St. Agnes's Hospital; Assistant Oral Surgeon to the Philadelphia Hospital; Instructor in Surgery in the Philadelphia Polyclinic; Demonstrator of Anatomy in the Dental Department of the University of Pennsylvania. 1716 Locust St.

1902. Dougherty, Sherborne W., M.D., Instructor in Physical Diagnosis in the University of Pennsylvania; Physician to the Dispensary of the German Hospital; Assistant Physician to the Methodist Hospital. 256 S. Sixteenth St.

1893. Downs, Norton, M.D. Fordhooke Farms, Three Tuns, Pa.

1864. Downs, R. N., M.D., Consulting Physician to the Germantown Hospital. 5916 Greene St., Germantown.

1902. Downs, Robert N., Jr., M.D., Surgeon to the Dispensary of the Germantown Hospital, 6008 Greene St., Germantown.

1864. Duer, Edward L., A.M., M.D., Gynecologist to the Presbyterian Hospital; Consulting Obstetrician to the Maternity Hospital and to the Preston Retreat. 1606 Locust St.

1897. Duer, S. Naudain, M.D., Physician to the Dispensary of the Presbyterian Hospital. 1916 Pine St.

1871. Duhring, L. A., M.D., Professor of Diseases of the Skin in the University of Pennsylvania; Honorary Member of the Dermatological Society of London, Società Itāliana di Dermatologia e Sifilographia, and Wiener Dermatologische Gesellschaft. 3322 Walnut St.

ELECTED

1881. Dulles, Charles Winslow, M.D., Lecturer on the History of Medicine in the University of Pennsylvania; Consulting Surgeon of the Rush Hospital. 4101 Walnut St.

*1860. Dunton, William R., M.D. Montrose, Pa.

1899. Edsall, David L., M.D., Professor of Therapeutics and Pharmacology in the University of Pennsylvania; Physician to the Episcopal Hospital. 1432 Pine St.

*1887. Edwards, William A., M.D., Professor of Pediatrics in the Medical Department of the University of Southern California. Fourth and Spring Sts., Los Angeles, Cal.

1904. Elmer, Walter G., M.D., Surgeon to the Out-patient Department of the Presbyterian Hospital; Instructor in Orthopedic Surgery in the University of Pennsylvania; Assistant Orthopedic Surgeon to the University Hospital; Consulting Physician to the Church Home for Children. 1801 Pine St.

1896. Ely, Thomas C., A.M., M.D. 2041 Green St.

1901. Erck, Theodore A., M.D., Assistant Surgeon to the Gynecean Hospital; Associate in Gynecology in the Philadelphia Polyclinic and College for Graduates in Medicine; Gynecologist to the Frederick Douglass Memorial Hospital. 251 S. Thirteenth St.

1893. Eshner, Augustus A., M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic and College for Graduates in Medicine; Physician to the Philadelphia Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Physician to the Hospital for Diseases of the Lungs, Chestnut Hill. 1019 Spruce St.

1868. Evans, Horace Y., A.M., M.D. 1631 Green St.

1905. Evans, Joseph S., Jr., M.D., Registrar to the Professor of Medicine in the University Hospital; Assistant Physician to the Philadelphia Hospital; Associate in the William Pepper Laboratory of Clinical Medicine; Instructor in Clinical Medicine in the University of Pennsylvania. 318 S. Fifteenth St.

1905. Evans, William, M.D. 4009 Chestnut St.

1894. Faries, Randolph, M.D. 2007 Walnut St.

1903. Farr, Clifford B., A.B., M.D., Professor of Diseases of the Stomach, etc., in the Philadelphia Polyclinic; Instructor in Medicine in the University of Pennsylvania; Physician

ELECTED

to the Medical Dispensary of the Hospital of the University of Pennsylvania; Visiting Physician to the Baptist Home. 211 S. Seventeenth St.

1893. Farr, William W., M.D., Physician to the Leamy Home. 117 Allen's Lane, Mount Airy.

1884. Fenton, Thomas H., M.D., Ophthalmologist to St. Vincent's Home, to the Home for Aged Couples, to the Baptist Home, and to the House of the Good Shepherd. 1319 Spruce St.

1907. Ferguson, Albert D., M.D., Visiting Physician to the Widener Memorial School for Crippled Children. 1549 N. Thirteenth St.

1907. Fetterolf, George, A.B., M.D., Demonstrator of Anatomy in the University of Pennsylvania; Laryngologist to the Methodist Episcopal Hospital; Laryngologist to the Henry Phipps Institute for Tuberculosis; Laryngologist to the Free Hospital for Poor Consumptives, White Haven, Pa. 330 S. Sixteenth St.

1907. Fife, Charles A., A.B., M.D., Instructor in Diseases of Children, and Associate in the William Pepper Clinical Laboratory in the University of Pennsylvania; Physician to St. Christopher's Hospital for Children, to the Children's Department of the Presbyterian Hospital, and to the Children's Department of the Mary J. Drexel Home; Assistant Pediatrist to the Philadelphia Hospital; Visiting Physician to St. Vincent's Home. 318 S. Fifteenth St.

1884. Fisher, Henry M., M.D., Physician to the Out-patient Department of the Pennsylvania Hospital. 1027 Pine St.

1888. Flick, Lawrence F., M.D. 736 Pine St.

*†1885. Fox, Joseph M., M.D. Leesburg, Va.

1906. Fraley, Frederick, Jr., A.B., M.D. 253 S. Thirteenth St.

1903. Francine, Albert P., A.M., M.D., Instructor in Medicine in the University of Pennsylvania; Physician to the Medical Dispensary of the University Hospital; Attending Physician to the Philadelphia Hospital, Department of Tuberculosis. 218 S. Fifteenth St.

1897. Frazier, Charles H., M.D., Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the University, to the Philadelphia, and to the Episcopal Hospitals; Surgeon to the Home for Crippled Children. 1724 Spruce St.

LLECTED

†1890. Freeman, Walter J., M.D., Emeritus Professor of Laryngology in the Philadelphia Polyclinic; Laryngologist to the Orthopædic Hospital; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb. 1832 Spruce St.

1893. Friebis, George, M.D., Ophthalmic Surgeon to the Lutheran Home and Orphanage, Mt. Airy. 1906 Chestnut St.

1889. Fussell, M. Howard, M.D., Assistant Professor of Medicine in the University of Pennsylvania; Physician to St. Timothy's Hospital; Physician to St. Mary's Hospital. 189 Green Lane, Manayunk.

1899. Gamble, Robert G., M.D., one of the Attending Physicians to the Bryn Mawr Hospital. Haverford, Pa.

1873. Gerhard, George S., M.D., Physician-in-Chief to the Bryn Mawr Hospital; Consulting Physician to Bryn Mawr College; Consulting Physician to Villa Nova College. Fifty-eighth Street and Overbrook Ave.

1902. Ghriskey, Albert A., M.D. 3936 Walnut St.

1892. Gibb, Joseph S., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Surgeon to the Ear, Nose and Throat Department of the Episcopal Hospital. 1907 Chestnut St.

1899. Gibbon, John H., M.D., Professor of Surgery in the Jefferson Medical College; Surgeon to the Pennsylvania and to the Bryn Mawr Hospitals; Consulting Surgeon to the Woman's Hospital. 1608 Spruce St.

1897. Girvin, John H., M.D., Physician for Diseases of Women at the Presbyterian Hospital; Instructor in Obstetrics in the University of Pennsylvania. 3924 Walnut St.

1889. Githens, William H. H., M.D., Visiting Physician to the Sheltering Arms. 1337 Pine St.

1906. Gittings, J. Claxton, M.D., Visiting Physician to the Children's Hospital of the Mary J. Drexel Home, and to the Medical Dispensary of the Children's Hospital; Assistant Physician to the Medical Dispensary of the German Hospital; Assistant Pediatric Physician to the University Hospital, and Assistant Instructor in Pediatrics in the University of Pennsylvania. 3942 Chestnut St.

1905. Given, Ellis E. W., M.D., Surgeon to the William L. Elkins Masonic Orphanage for Girls; Surgeon to the Dispensary of the Episcopal Hospital; Surgeon to the Dispensary of

ELECTED

St. Christopher's Hospital for Children. 2714 Columbia Ave.

1894. Gleason, E. B., M.D., Clinical Professor of Otology in the Medico-Chirurgical College; Surgeon-in-Charge of the Nose, Throat, and Ear Department of the Northern Dispensary. 2033 Chestnut St.

1884. Godey, Harry, M.D. Aldine Hotel.

1906. Goepp, R. Max, M.D., Professor of Clinical Medicine and Dean of the Philadelphia Polyclinic and College for Graduates in Medicine. 332 S. Fifteenth St.

1906. Goldberg, Harold G., M.D., Curator and Pathologist to the Wills Eye Hospital; First Lieutenant and Assistant Surgeon to the Second Troop, Philadelphia City Cavalry, N. G. P. 1905 Chestnut St.

1893. Goodell, W. Constantine, M.D. 300 S. Thirteenth St.

1905. Gordon, Alfred, M.D., Associate in Nervous and Mental Diseases in the Jefferson Medical College; Examiner of the Insane at the Philadelphia Hospital. 1430 Pine St.

†1897. Gould, George M., A.M., M.D. 1722 Walnut St.

1894. Graham, Edwin E., M.D., Professor of Pediatrics in the Jefferson Medical College; Pediatrist to the Jefferson and to the Philadelphia Hospitals; Physician to the Franklin Reformatory Home. 1713 Spruce St.

1885. Graham, John, M.D. 326 S. Fifteenth St.

1904. Grayson, Charles P., M.D., Clinical Professor of Laryngology and Rhinology in the University of Pennsylvania; Physician-in-Charge of Throat and Nose Department of the University Hospital; Otolaryngologist to the Philadelphia Hospital. 251 S. Sixteenth St.

1883. Griffith, J. P. Crozer, M.D., Clinical Professor of the Diseases of Children in the University of Pennsylvania; Physician to St. Agnes's, to the Children's, and to the Methodist Hospitals. 1810 Spruce St.

1902. Gwyn, Norman B., M.B., Instructor in Medicine in the University of Pennsylvania. 23 S. Twenty-first St.

*1893. Hamill, Robert H., M.D. Summit, N. J.

1894. Hamill, Samuel McC., M.D., Professor of Diseases of Children in the Philadelphia Polyclinic and College for Graduates in Medicine; Pediatrist to the Presbyterian Hospital; Pediatrist to St. Vincent's Home. 1822 Spruce St.

ELECTED

1897. Hand, Alfred, Jr., M.D., Visiting Physician to the Children's Hospital, Children's Hospital of the Mary J. Drexel Home of Philadelphia, and to the Methodist Hospital. 1724 Pine St.

1886. Hansell, Howard F., M.D., Professor of Ophthalmology in the Jefferson Medical College; Ophthalmic Surgeon to the Philadelphia Hospital and to the Jefferson Medical College Hospital; Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic. 1528 Walnut St.

1889. Hare, Hobart A., M.D., Professor of Therapeutics in the Jefferson Medical College; Physician to the Jefferson Medical College Hospital. 1801 Spruce St.

1865. Harlan, George C., M.D., Consulting Surgeon to the Wills Eye Hospital; Ophthalmologist to the Pennsylvania Hospital; Consulting Ophthalmologist to the Pennsylvania Institution for the Blind, and to the Pennsylvania Institution for the Deaf. 1700 Walnut St.

1903. Hart, Charles D., M.A., M.D., Physician to the Outpatient Department of the Pennsylvania Hospital; Inspector of the Eastern Penitentiary. 1317 Walnut St.

1885. Harte, Richard H., M.D., Adjunct Professor of Surgery in the University of Pennsylvania; Surgeon to the Pennsylvania and to the Orthopædic Hospitals; Consulting Surgeon to St. Mary's, to St. Timothy's, and to the Bryn Mawr Hospitals. 1503 Spruce St.

1888. Hartzell, Milton B., M.D., Associate in Dermatology in the University of Pennsylvania; Clinical Professor of Dermatology in the Woman's Medical College of Pennsylvania; Dermatologist to the Philadelphia Hospital. 3644 Chestnut St.

1907. Hatfield, Charles James, A.B. (Princeton), M.D., Physician to the Henry Phipps Institute for the Study, Treatment and Prevention of Tuberculosis; Visiting Physician to the White Haven Sanatorium. 2008 Walnut St.

1872. Hays, I. Minis, M.D. 266 S. Twenty-first St.

1882. Hearn, W. Joseph, M.D., Professor of Clinical Surgery in the Jefferson Medical College; Surgeon to the Philadelphia Hospital. 1120 Walnut St.

1901. Heisler, John C., M.D., Professor of Anatomy in the Medico-Chirurgical College. 3829 Walnut St.

1884. Henry, Frederick P., M.D., Professor of the Principles and Practice of Medicine in the Woman's Medical College

ELECTED

of Pennsylvania; Physician to the Philadelphia Hospital; Corresponding Member of the Royal Academy of Medicine of Rome. 1635 Locust St.

1903. Henry, J. Norman, M.D., Physician to the Out-patient Department of the Pennsylvania Hospital; Assistant Physician to the Philadelphia Hospital; Clinical Instructor in Medicine in the Woman's Medical College of Pennsylvania; Physician-in-Charge of the De Lancey School. 252 S. Sixteenth St.

1891. Hewson, Addinell, A.M., M.D., Professor of Anatomy in the Philadelphia Polyclinic and College for Graduates in Medicine; Surgeon to St. Timothy's Hospital, Roxborough. 2120 Spruce St.

1872. Hinkle, A. G. B., M.D. 1300 Spring Garden St.

1897. Hinkle, William M., M.D., Lecturer on the Anatomy and Physiology of the Vocal Organs in the National School of Elocution and Oratory. 1323 N. Thirteenth St.

*1892. Hinsdale, Guy, A.M., M.D., Secretary of the American Climatological Association; Corresponding Member of the British Balneological and Climatological Society; Fellow of the American Academy of Medicine; Lecturer on Climatology in the Medico-Chirurgical College, Philadelphia. Hot Springs, Va.

1888. Hirsh, A. Bern, M.D., Physician to the Home for Aged Couples. 1711 Diamond St.

1888. Hirst, Barton Cooke, M.D., Professor of Obstetrics in the University of Pennsylvania; Gynecologist to the Philadelphia and to the Howard Hospitals. 1821 Spruce St.

1903. Hirst, John Cooke, M.D., Assistant Obstetrician to the University and the Philadelphia Hospitals; Attending Physician to the Maternity Hospital and to the Gynecological Dispensary of the Howard Hospital; Consulting Obstetrician to the Southeastern Dispensary. 1618 Pine St.

*1894. Hoch, William R., M.D. 1521 Lakeld St., Pueblo, Col.

1905. Hodge, Edward B., Jr., M.D., Surgeon to the Out-patient Department of the Pennsylvania Hospital; Assistant Surgeon to the Orthopædic Hospital; Dispensary Surgeon to the Presbyterian Hospital; Surgeon to the Children's Hospital. 346 S. Sixteenth St.

1885. Holland, James W., M.D., Professor of Medical Chemistry and Toxicology in the Jefferson Medical College. 2006 Chestnut St.

ELECTED

1906. Holloway, Thomas B., M.L., Assistant Surgeon to the Dispensary for Diseases of the Eye at the University Hospital; Assistant Ophthalmologist to the Orthopædic Hospital; Registrar of the Ophthalmic Wards of the Philadelphia Hospital; Ophthalmologist to the Philadelphia Orphanage. 1819 Chestnut St.

1888. Horwitz, Orville, M.D., Professor of Genito-urinary Surgery in the Jefferson Medical College; Surgeon to the Jefferson Medical College Hospital, to St. Agnes's Hospital, and to the State Hospital for the Insane; Consulting Surgeon to the Jewish Hospital. 1721 Walnut St.

1892. Hughes, William E., M.D., Visiting Physician to the Philadelphia Hospital; Pathologist to the Presbyterian Hospital. 3945 Chestnut St.

1898. Hutchinson, James P., M.D., Surgeon to the Pennsylvania, to the Methodist, to the Children's, to St. Timothy's, and to the Bryn Mawr Hospitals; Adjunct Professor of Surgery in the University of Pennsylvania. 1702 Locust St.

1871. Ingham, James V., M.D. 1811 Walnut St.

*1885. Jackson, Edward, M.D., Professor of Ophthalmology in the University of Colorado; Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic; Ophthalmologist to the Denver City and County Hospital. McPhee Building, Denver, Col.

1906. Jacobs, Francis Brinton, B.S., M.D., Visiting Physician to the Philadelphia Orphan Asylum; Pediatrist to the American Hospital for Diseases of the Stomach; Assistant in the Laboratory of the Polyclinic Hospital. 334 S. Nineteenth St.

1887. Jayne, Horace, M.D., Ph.D. 318 S. Nineteenth St.

1898. Johnson, Russell H., A.B. (Princeton), M.D., Physician to the Pennsylvania Institution for the Deaf and Dumb; Physician to the Chestnut Hill Hospital. Chestnut Hill, Philadelphia.

1900. Jones, Charles James, A.M., M.D., Ophthalmic Surgeon to the House of the Good Shepherd, Germantown; Assistant Surgeon to the Wills Eye Hospital. 1009 N. Sixth St.

1900. Jopson, John H., M.D., Surgeon to the Children's, to the Presbyterian, and to the Bryn Mawr Hospitals, and to the Philadelphia Home for Incurables. 1824 Pine St.

ELECTED

1885. Judd, Leonardo da Vinci, M.D. 3603 Powelton Ave.

1900. Judson, Charles F., A.B., M.D., Physician to St. Christopher's Hospital for Children, to the Southern Home for Destitute Children, and to the Sheltering Arms. 1539 Pine St.

1902. Jump, Henry D., M.D., Instructor in Medicine in the University of Pennsylvania; Assistant Physician to the Medical Dispensary of the University Hospital. Forty-seventh St. and Chester Ave.

1886. Jurist, Louis, M.D. 916 N. Broad St.

1903. Kalteyer, Frederick J., M.D., Demonstrator of Clinical Medicine in the Jefferson Medical College; Chief of the Out-patient Department, Assistant Attending Physician and Hematologist to the Jefferson Medical College Hospital; Pathologist to the Philadelphia Lying-in-Charity. 214 S. Fifteenth St.

1904. Kane, J. A. Bayard, M.D. 1529 Spruce St.

†1867. Keen, William W., M.D., LL.D., (Hon.) F.R.C.S. (Eng. and Edin.), Emeritus Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College; Membre Correspondant Étranger de la Société de Chirurgie de Paris; Honorary Member of the Société Belge de Chirurgie and of the Clinical Society of London; Ehrenmitglied der deutschen Gesellschaft für Chirurgie. 1729 Chestnut St.

1897. Kelly, Aloysius O. J., A.M., M.D., Assistant Professor of Medicine in the University of Pennsylvania; Professor of the Theory and Practice of Medicine in the University of Vermont; Professor of Pathology in the Woman's Medical College of Pennsylvania; Physician to St. Agnes's Hospital, and Pathologist to the German Hospital. 1911 Pine St.

*1887. Kelly, Howard A., M.D., Professor of Gynecology in Johns Hopkins University and Gynecologist to the Johns Hopkins Hospital, Baltimore, Md. 1406 Eutaw Place, Baltimore, Md.

1898. Kempton, Augustus F., M.D. 2118 Pine St.

1905. Kercher, Delno E., M.D. 1927 S. Eighteenth St.

1902. King, William Howard, M.D. 6315 McCallum St.

*1907. Kinyoun, Joseph J., M.D., Ph.D. (Georgetown), Professor of Pathology and Bacteriology in the George Washington University. 1423 Clifton St., Washington, D. C.

ELECTED

1895. Kneass, Samuel S., M.D., Associate in the William Pepper Laboratory of Clinical Medicine in the University of Pennsylvania. 1510 Walnut St.

1904. Krauss, Frederick, M.D., Ophthalmic Surgeon to St. Christopher's Hospital for Children and Dispensary; Instructor in Ophthalmology in the Philadelphia Polyclinic. 930 N. Franklin St.

1905. Kremer, Walter H., M.D. 6122 Main St., Germantown.

1900. Krusen, Wilmer, M.D., Instructor in Gynecology in Jefferson Medical College; Assistant Gynecologist and Chief of the Gynecological Dispensary of St. Joseph's Hospital; Consulting Gynecologist to the Children's Hospital in Germantown. 127 N. Twentieth St.

1897. Kyle, D. Braden, A.M., M.D., Professor of Laryngology in the Jefferson Medical College; Consulting Laryngologist, Rhinologist, and Otologist to St. Agnes's Hospital and to the Philadelphia Home for Incurables; Laryngologist to the New Jersey Training School for Feeble-minded Children; Bacteriologist to the Orthopædic Hospital and Infirmary for Nervous Diseases. 1517 Walnut St.

*1892. Laine, Damaso T., M.D., Havana, Cuba.

1904. Landis, Henry R. M., M.D., Visiting Physician to the White Haven Sanatorium; Member of the Staff of the Henry Phipps Institute; Assistant Visiting Physician to the Philadelphia Hospital. 11 S. Twenty-first St.

1907. Langdon, H. Maxwell, M.D., Instructor in Ophthalmology in the University of Pennsylvania; Assistant Surgeon to the Dispensary for Diseases of the Eye in the University Hospital; Assistant Ophthalmologist to the Orthopædic Hospital; Ophthalmologist to the Methodist Episcopal Home for the Aged. 1728 Chestnut St.

1904. Le Boutillier, Theodore, M.D., Physician to the Dispensary of St. Christopher's Hospital for Children; Instructor in Diseases of Children in the Philadelphia Polyclinic; Registrar to the Medical Dispensary of the Children's Hospital; Visiting Physician to the Baptist Orphanage and Haddock Memorial Home. 216 S. Twentieth St.

1893. Le Conte, Robert G., A.B., M.D., Surgeon to the Pennsylvania and the Bryn Mawr Hospitals; Consulting Surgeon to the Germantown and the Gynecean Hospitals. 1530 Locust St.

ELECTED

1887. Leaman, Henry, M.D. 832 N. Broad St.

1903. Leffmann, Henry, A.M., D.D.S., Ph.D., Professor of Chemistry in the Woman's Medical College of Pennsylvania; Professor of Chemistry in the Wagner Free Institute of Science; Emeritus Professor of Chemistry in the Pennsylvania College of Dental Surgery; Pathological Chemist to the Jefferson Medical College Hospital. 39 S. Tenth St.

1892. Leidy, Joseph, M.D., Officier l'instruction publique, France; Consulting Physician to the Pennsylvania Training School for Feeble-minded Children. 1319 Locust St.

1903. Leonard, Charles Lester, M.D. 112 S. Twentieth St.

1877. Lewis, Morris J., M.D., Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases and to the Pennsylvania Hospital. 1316 Locust St.

1904. Lindauer, Eugene, M.D., Instructor in Clinical Medicine in the Philadelphia Polyclinic. 2018 N. Thirty-second St.

1886. Lloyd, J. Hendrie, A.M. (Princeton), M.D., Neurologist to the Philadelphia Hospital; Physician to the Methodist Episcopal Hospital, and to the Home for Crippled Children; Consulting Neurologist to the State Asylum for the Chronic Insane of Pennsylvania and to the Pennsylvania Training School for Feeble-minded Children. 3918 Walnut St.

1900. Lodge, John W., M.D., Consulting Physician to the Bryn Mawr Hospital. Merion, Pa.

1907. Lodholz, Edward, M.D., Demonstrator of Physiology in the University of Pennsylvania. Department of Medicine, University of Pennsylvania.

1893. Longaker, Daniel, M.D., Surgeon to the Jewish Maternity Hospital. 1402 N. Sixteenth St.

1906. Longcope, Warfield T., M.D., Director of the Ayer Clinical Laboratory of the Pennsylvania Hospital; Instructor in Medicine in the University of Pennsylvania. 323 S. Sixteenth St.

1877. Longstreth, Morris, M.D. 1416 Spruce St.

1907. Loux, Hiram R., M.D. 1614 N. Broad St.

1900. McCarthy, Daniel J., M.D., Instructor in Neurology in the Philadelphia Polyclinic; Associate of the William Pepper Laboratory of Clinical Medicine. 1329 Spruce St.

1875. McClellan, George, M.D., Consulting Surgeon to the Howard Hospital. 1116 Spruce St.

ELECTED

*1903. McConnell, Guthrie, M.D., Bacteriologist to the Missouri State Board of Health; Pathologist to the St. Louis Skin and Cancer Hospital, and to St. Luke's Hospital. 4175 Washington Ave., St. Louis, Mo.

1895. McFarland, Joseph, M.D., Professor of Pathology and Bacteriology in the Medico-Chirurgical College; Pathologist to the Medico-Chirurgical and the Philadelphia Hospitals. 442 W. Stafford St., Germantown.

1906. McKee, James H., M.D., Clinical Professor of Pediatrics in the Woman's Medical College of Pennsylvania; Professor of Diseases of Children in the Philadelphia Polyclinic; Pediatrist to the Philadelphia Hospital. 1519 Poplar St.

1905. McKenzie, Robert Tait, A.B., M.D., Professor of Physical Education and Director of the Department of Physical Education in the University of Pennsylvania. 26 S. Twenty-first St.

*1900. McReynolds, Robert Phillips, M.D. 213 S. Broadway, Los Angeles, Cal.

1886. MacCoy, Alexander W., M.D., Surgeon for Diseases of the Nose and Throat in the Out-patient Department of the Pennsylvania Hospital; Member of the American Laryngological Society. 216 S. Fifteenth St.

1901. MacLeod, George I., Jr., M.D., Physician to the Bryn Mawr Hospital; Assistant Physician to Bryn Mawr College. Ardmore, Pa.

1896. Makuen, G. Hudson, M.D., Professor of Defects of Speech in the Philadelphia Polyclinic; Laryngologist to St. Mary's Hospital and to the Frederick Douglass Memorial Hospital; Visiting Consultant on Defects of Speech to the New Jersey Training School for Feeble-minded Children. 1627 Walnut St.

*1885. Mallet, John William, M.D., Ph.D. (Goett.), LL.D. (Princeton and Johns Hopkins), F.R.S., Professor of Chemistry in the University of Virginia. University of Virginia, Charlottesville, Va.

1898. Marshall, George Morley, M.D., Laryngologist to the Philadelphia Hospital; Physician and Laryngologist to St. Joseph's Hospital. 1819 Spruce St.

1893. Marshall, John, M.D., Nat. Sc. D., LL.D., Professor of Chemistry and Toxicology in the University of Pennsylvania. 1718 Pine St.

ELECTED

1889. Martin, Edward, M.D., Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to University, Howard, Philadelphia, and Bryn Mawr Hospitals. 1506 Locust St.

1885. Mays, Thomas J., M.D., Visiting Physician to the Rush Hospital. 1829 Spruce St.

*1868. Mears, J. Ewing, M.D., 1535 Land Title Building, Broad and Sansom Sts.

1875. Meigs, Arthur V., M.D., Physician to the Pennsylvania Hospital; Consulting Physician to the Pennsylvania Institution for the Instruction of the Blind. 1322 Walnut St.

1894. Miller, D. J. Milton, M.D., Visiting Physician to the Episcopal and to the Children's Hospitals. 1801 Pine St.

1881. Mills, Charles K., M.D., Professor of Neurology in the University of Pennsylvania; Neurologist to the Philadelphia Hospital; Consultant to the Orthopædic Hospital and Infirmary for Nervous Diseases. 1909 Chestnut St.

1904. Mitchell, Charles F., M.D., Surgeon to the Germantown Hospital and to the Out-patient Department of the Pennsylvania Hospital; Assistant Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases. 251 S. Seventeenth St.

†1888. Mitchell, John K., M.D., Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Assistant Neurologist to the Presbyterian Hospital; Attending Physician to the Pennsylvania Training School for Feeble-minded Children. 1730 Spruce St.

1856. Mitchell, S. Weir, M.A., M.D., LL.D. (Edinburgh, Harvard, Princeton and Toronto), Foreign Correspondent (1st Div.) French Academy of Medicine; Corresponding Member of the Verein für Innerer Medicin, Berlin; Honorary Member of the Royal Medico-Chirurgical Society of London; Doctor of Medicine, Honoris Causa, University of Bologna. 1524 Walnut St.

1882. Montgomery, Edward E., M.D., Professor of Gynecology in the Jefferson Medical College; Gynecologist to the Jefferson Medical College Hospital and to St. Joseph's Hospital. 1703 Walnut St.

1886. Morris, Caspar, M.D. 2050 Locust St.

1893. Morris, Elliston J., M.D., Physician to the Episcopal Hospital and to the Midnight Mission. 128 S. Eighteenth St.

ELECTED

1883. Morris, Henry, M.D., Professor of Anatomy in the Woman's Medical College of Pennsylvania; Senior Visiting Physician to St. Joseph's Hospital; Associate Member, Military Surgeons of U. S. A. 313 S. Sixteenth St.

1856. Morris, J. Cheston, M.D. 1514 Spruce St.

1906. Morrison, William H., M.D., Surgeon to the Frankford Hospital. 8021 Frankford Ave.

1897. Morton, Samuel W., M.D. 1933 Chestnut St.

1891. Morton, Thomas S. K., M.D. School House Lane, Germantown.

1904. Moulton, Albert R., M.D., Senior Assistant Physician to the Pennsylvania Hospital for the Insane; Physician to the Out-patient Department for Nervous and Mental Diseases at the Pennsylvania Hospital; Professor of Mental Diseases in the Maine Medical School (Bowdoin College). Pennsylvania Hospital for the Insane.

1905. Muller, George P., M.D., Instructor in Surgery in the University of Pennsylvania; Assistant Surgeon to the Philadelphia Hospital; Assistant Surgeon to the Home for Crippled Children; Assistant Pathologist to the German Hospital. 314 S. Fifteenth St.

1882. Musser, John H., M.D., Professor of Clinical Medicine in the University of Pennsylvania; Physician to the University, the Philadelphia, and the Presbyterian Hospitals. 1927 Chestnut St.

1905. Mutschler, Louis H., M.D., Surgeon to the Dispensary of the Episcopal Hospital; Surgeon to the Dispensary of St. Christopher's Hospital for Children; Assistant Surgeon to the Orthopædic Hospital. 2030 Tioga St.

1896. Myers, T. D., M.D. 1521 Spruce St.

1902. Nassau, Charles F., M.D., Surgeon to St. Joseph's Hospital; Consulting Surgeon to the Frankford Hospital; Assistant Surgeon to the Jefferson Medical College Hospital; Demonstrator of Applied Anatomy in Jefferson Medical College. 1831 Chestnut St.

1886. Neff, Joseph S., M.D. 2031 Spruce St.

1887. Neilson, Thomas Rundle, A.M., M.D., Surgeon to the Episcopal Hospital and to St. Christopher's Hospital for Children; Clinical Professor of Genito-urinary Diseases in the University of Pennsylvania. 122 S. Seventeenth St.

1905. Newcomet, William S., M.D. 3501 Baring St.

ELECTED

1905. Newlin, Arthur, M.D., Physician to the Dispensary of the Children's Hospital; Assistant Physician to the Orthopædic Hospital. 253 S. Thirteenth St.

1899. Nicholson, William R., Jr., M.D., Assistant Instructor in Obstetrics in the University of Pennsylvania; Obstetrician to the Maternity Hospital; Assistant Surgeon to the Gynecean Hospital. 350 S. Fifteenth St.

1889. Noble, Charles P., M.D., Surgeon-in-Chief to the Kensington Hospital for Women; Surgeon-in-Charge of the Department for Women of the Northern Dispensary and of the Union Mission Hospital; Clinical Professor of Gynecology in the Woman's Medical College of Pennsylvania; Lecturer on Gynecology in the Philadelphia Polyclinic. 1509 Locust St.

1898. Nolan, Edward J., M.D., Recording Secretary and Librarian of the Academy of Natural Sciences of Philadelphia. 825 N. Twentieth St.

1905. Norris, Charles C., M.D., Instructor in Gynecology in the University of Pennsylvania; Assistant Gynecologist to the Philadelphia and to the Howard Hospitals. 1503 Locust St.

1905. Norris, George William, A.B., M.D., Instructor in Medicine in the University of Pennsylvania; Assistant Physician to the Philadelphia Hospital; Physician to the Henry Phipps Institute for the Study, Prevention and Treatment of Tuberculosis; Physician to the Dispensary of the Episcopal Hospital. 1530 Locust St.

*1901. Norris, Henry, M.D. Rutherfordton, N. C.

*1865. Norris, Isaac, M.D. Care Morgan, Harjes & Co., Paris, France.

1892. Norris, Richard C., M.D., Lecturer on Clinical and Operative Obstetrics in the University of Pennsylvania; Obstetrician in Charge to the Preston Retreat; Visiting Obstetrician to the Philadelphia Hospital; Gynecologist to the Methodist Episcopal Hospital and Consulting Obstetrician and Attending Gynecologist to the Southeastern Dispensary and Hospital. 500 N. Twentieth St.

1884. Oliver, Charles A., A.M., M.D., Surgeon to the Wills Eye Hospital; Ophthalmic Surgeon to the Philadelphia and to the Presbyterian Hospitals; Clinical Professor of Ophthal-

ELECTED

nology in the Woman's Medical College of Pennsylvania. 1507 Locust St.

*1884. O'Neill, J. Wilks, M.D. Bergenfield, N. J.

*1885. Osler, William, M.D., Regius Professor of Medicine in Oxford University, England. No. 7, Norman Gardens, Oxford, England.

1903. Ostheimer, Maurice, M.D., Senior Instructor in Pediatrics in the University of Pennsylvania; Physician-in-Charge of the Children's Dispensary, University Hospital; Visiting Physician to the Baptist Orphanage. 225 S. Twentieth St.

1897. Packard, Francis R., M.D., Aurist to the Out-patient Department of the Pennsylvania Hospital; Professor of Diseases of the Ear in the Philadelphia Polyclinic and College for Graduates in Medicine; Consulting Aurist to the Bryn Mawr Hospital. Southeast corner of Nineteenth and Pine Sts.

1898. Page, Henry F., M.D., Assistant Physician to the German Hospital and Physician to the Medical Dispensary of the same; Instructor in Clinical Medicine in the Woman's Medical College of Pennsylvania; Physician to the Baptist Home. 1907 Girard Ave.

1906. Pancoast, Henry K., M.D., Lecturer on Skiagraphy in the University of Pennsylvania; Skiagrapher to the University Hospital. 3211 Baring St.

1899. Parke, William E., M.D., Assistant Surgeon in the Department for Diseases of Women in the Northern Dispensary; Clinical Assistant and Surgeon to the Dispensary of the Kensington Hospital for Women. 1739 N. Seventeenth St.

1906. Parker, Frank C., M.D., Assistant Surgeon to the Wills Eye Hospital; Ophthalmic Surgeon to the Charity Hospital, Norristown; Ophthalmologist to the State Hospital for the Insane at Norristown; Radiographer to Charity Hospital, Norristown. 131 W. Main St., Norristown, Pa.

*1903. Pearce, Richard M., M.D., Director of the Bender Laboratory, Albany, N. Y.; Professor of Pathology in the Albany Medical School; Director of the Bureau of Pathology and Bacteriology of the New York State Board of Health. Albany, N. Y.

†1889. Penrose, Charles Bingham, M.D., Ph.D. (Harvard), Formerly Professor of Gynecology in the University of Pennsylvania. 1720 Spruce St.

ELECTED

1854. Penrose, R. A. F., M.D., LL.D., Professor (Emeritus) of Obstetrics and Diseases of Women and Children in the University of Pennsylvania. 1331 Spruce St.

†1902. Pepper, William, M.D., Instructor in Medicine in the University of Pennsylvania. 1811 Spruce St.

1884. Perkins, Francis M., M.D., Ophthalmic Surgeon to St. Agnes's Hospital. 1428 Pine St.

1905. Pfahler, George E., M.D., Adjunct Professor of Symptomatology in the Medico-Chirurgical College; Director of the Röntgen Ray Laboratory, and Assistant Physician to the Medico-Chirurgical Hospital. 1321 Spruce St.

1907. Pfromm, George W., Ph.G., M.D. 1434 N. Fifteenth St.

1907. Phillips, Horace, M.D., Second Assistant Physician to the Pennsylvania Hospital for the Insane; Visiting Physician to the Eastern Penitentiary of Pennsylvania. Pennsylvania Hospital for the Insane.

*1899. Phillips, John L., M.D. The Bellefield, Pittsburgh, Pa.

1883. Piersol, George A., M.D., Professor of Anatomy in the University of Pennsylvania. 4722 Chester Ave.

1905. Pitfield, Robert L., M.D., Pathologist to the Germantown Hospital; Bacteriologist to the Chestnut Hill Hospital for Lung Diseases. 5211 Wayne Ave.

1896. Posey, William Campbell, M.D., Surgeon to the Wills Eye Hospital; Professor of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmic Surgeon to the Howard Hospital; Ophthalmologist to the Pennsylvania Hospital for Epileptics. 1835 Chestnut St.

1902. Potts, Barton H., M.D., Laryngologist and Aurist to the German and to St. Mary's Hospitals; Assistant Aural Surgeon and Chief of the Ear Dispensary of the Children's Hospital; Laryngologist to the Pennsylvania Training School for Feeble-minded Children. 109 S. Twentieth St.

1899. Potts, Charles S., M.D. Professor of Neurology in the Medico-Chirurgical College; Neurologist to the Philadelphia Hospital; Consultant to the Insane Department of the Philadelphia Hospital; Consultant to the Hospital for the Insane, Atlantic County, New Jersey. 1728 Chestnut St.

1905. Prendergast, Michael T., M.D. 2435 Columbia Ave.

1907. Price, George E., M.D., Instructor in Neurology in the Jefferson Medical College; Assistant in the Neurological Dispensary of the Jefferson Medical College Hospital;

ELECTED

Assistant Neurologist to the Philadelphia Hospital. 1810 Tioga St.

†1889. Price, Joseph, M.D., Obstetric Physician to the Philadelphia Dispensary. 241 N. Eighteenth St.

1903. Purves, George Morehouse, M.D., Registrar of the Surgical Dispensary of the Hospital of the University of Pennsylvania. 4204 Walnut St.

†1903. Pyle, Walter L., A.M., M.D., Member of the American Ophthalmological Society; Assistant Surgeon to the Wills Eye Hospital. 1806 Chestnut St.

1887. Randall, B. Alexander, M.A., M.D., Clinical Professor of Diseases of the Ear in the University of Pennsylvania; Ear Surgeon to the Children's Hospital; Consulting Aurist to the Pennsylvania Institution for the Deaf and Dumb, and to St. Timothy's Hospital. 1717 Locust St.

*1904. Ravenel, Mazyck P., M.D., Professor of Bacteriology in the University of Wisconsin. Madison, Wis.

1887. Reed, Charles H., M.D. 121 S. Seventeenth St.

1885. Reichert, Edward T., M.D., Professor of Physiology in the University of Pennsylvania. University of Pennsylvania.

1897. Rhein, John H. W., M.D., Neurologist to the Howard Hospital; Physician to the Philadelphia Home for Incurables; Bacteriologist to the Pennsylvania Training School for Feeble-minded Children. 1732 Pine St.

1906. Rhein, Robert D., M.D., Assistant in the Department of General Medicine at the Howard Hospital. 2016 Pine St.

1891. Rhoads, Edward G., M.D., 159 W. Coulter St., Germantown.

1898. Riesman, David, M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic; Associate in Medicine in the University of Pennsylvania; Physician to the Philadelphia and to the Jewish Hospitals. 1624 Spruce St.

1895. Ring, G. Oram, A.M., M.D., Ophthalmic Surgeon to the Episcopal Hospital; Ophthalmologist to the Widener Memorial Home for Crippled Children; Consulting Ophthalmologist to the American Oncologic Hospital. 1901 Chestnut St.

1905. Risley, J. Norman, M.D., Assistant Surgeon to the Wills Eye Hospital; Ophthalmologist to the Pennsylvania Training School for Feeble-minded Children. 1728 Chestnut St.

ELECTED

1891. Risley, S. D., M.D., Attending Surgeon to the Wills Eye Hospital; Professor (Emeritus) of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Member of the Board of Managers of the Pennsylvania Training School for Feeble-minded Children; Alumnus Manager of the University Hospital. 1728 Chestnut St.

†1878. Roberts, John B., M.D., Professor of Surgery in the Philadelphia Polyclinic; Surgeon to the Methodist Episcopal Hospital. 313 S. Seventeenth St.

1899. Roberts, Walter, M.D., Professor of Otology in the Philadelphia Polyclinic; Otologist to the Methodist Episcopal Hospital; Laryngologist to the Philadelphia Hospital. 1732 Spruce St.

1903. Robertson, William Egbert, M.D., Assistant Visiting Physician and Chief of Dr. Daland's Clinic in the Medico-Chirurgical Hospital; Lecturer to Nurses in the Medico-Chirurgical Hospital; Physician to the Episcopal Hospital. 320 S. Sixteenth St.

1907. Robinson, Edwin Taylor, M.D. 1326 Pine St.

1902. Robinson, James Weir, M.D., Assistant Surgeon to the Presbyterian Hospital. 326 S. Sixteenth St.

1903. Robinson, William Duffield, Ph.G., M.D. 2012 Mount Vernon St.

1900. Rodman, William L., M.D., Professor of Surgery in the Medico-Chirurgical College; Professor of Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Presbyterian Hospital; Surgeon to the Philadelphia Hospital. 1904 Chestnut St.

1898. Ross, George G., M.D., Assistant Surgeon to the German Hospital and Surgeon to the Out-patient Department of the same; Surgeon to the Germantown Hospital. 1721 Spruce St.

1907. Royer, B. Franklin, M.D., Chief Resident Physician in the Municipal Hospital of Philadelphia. Municipal Hospital, Twenty-second St. and Lehigh Ave.

1905. Rugh, James Torrance, M.D., Orthopedic Surgeon to the Methodist Hospital; Demonstrator of Orthopedic Surgery in the Jefferson Medical College; Assistant Orthopedist to the Jefferson Hospital; Assistant Orthopedist to the Philadelphia Hospital. 1616 Spruce St.

ELECTED

1897. Sailer, Joseph, M.D., Associate in Medicine in the University of Pennsylvania; Associate of the Pepper Clinical Laboratory of the University of Pennsylvania; Pathologist to the Pennsylvania Training School for Feeble-minded Children. 248 S. Twenty-first St.

1900. Sajous, Charles E. de M., M.D. 2043 Walnut St.

1905. Sartain, Paul J., M.D. 212 W. Logan Square.

1906. Saylor, Edwin S., M.D., Ophthalmologist to St. Timothy's Hospital, Roxborough. 2005 Chestnut St.

1899. Schamberg, Jay F., M.D., Professor of Dermatology and Infectious Eruptive Diseases in the Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Physician to the Municipal Hospital for Infectious Diseases. 1922 Spruce St.

1907. Schwartz, George J., M.D., Assistant Surgeon to the Philadelphia Hospital; Instructor in Surgery in Jefferson Medical College. 1633 S. Fifteenth St.

1887. de Schweinitz, George E., M.D., Professor of Ophthalmology in the University of Pennsylvania; Ophthalmic Surgeon to the Philadelphia Hospital; Consulting Ophthalmic Surgeon to the Philadelphia Polyclinic; Ophthalmologist to the Orthopaedic Hospital and Infirmary for Nervous Diseases. 1705 Walnut St.

1895. Scott, J. Alison, M.D., Adjunct Professor of Medicine in the University of Pennsylvania; Visiting Physician to the Pennsylvania Hospital; Physician to the Church Home for Children. 1834 Pine St.

1892. Seiss, Ralph W., M.D., Professor of Otology in the Philadelphia Polyclinic; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb. 255 S. Seventeenth St.

1897. Sharpless, William T., M.D., Physician to the Chester County Hospital. West Chester, Pa.

1906. Shields, William G., M.D., Demonstrator of Morbid Anatomy in the Medico-Chirurgical College; Assistant Pathologist to the Philadelphia Hospital; Assistant Physician to the Howard Hospital; Assistant Physician to the Jewish Hospital. 412 School House Lane, Germantown.

1876. Shippen, Edward, A.M. (Princeton), M.D., Medical Director, U. S. Navy (retired). 2039 Pine St.

1891. Shober, John B., A.M., M.D., Associate Gynecologist to the Gynecean Hospital; Gynecologist to the Howard Hospital;

ELECTED

Obstetrician to the Philadelphia Hospital. 1731 Pine St.

1890. Shoemaker, George Erety, A.M., M.D., Gynecologist to the Presbyterian Hospital and to the Pennsylvania Epileptic Hospital and Colony Farm; Consulting Surgeon to the Woman's Hospital of Philadelphia. 1831 Chestnut St.

†1893. Shoemaker, Harvey, M.D., Visiting Physician to the Sheltering Arms and to the Southern Home for Destitute Children; Assistant Physician to the German Hospital; Physician to the Out-patient Department of the German and the Pennsylvania Hospitals. 2011 Chestnut St.

†1896. Shoemaker, William T., M.D., Ophthalmic Surgeon to the Germantown Hospital; Assistant Ophthalmologist and a Chief of Clinic to the German Hospital; Dispensary Ophthalmic Surgeon to the Presbyterian Hospital; Oculist to Pennsylvania Institution for the Deaf and Dumb. 2031 Chestnut St.

1900. Shumway, Edward Adams, B.S., M.D., Instructor in Ophthalmology in the University of Pennsylvania, and Assistant Ophthalmic Surgeon to the University Hospital; Assistant Ophthalmologist to the Philadelphia Hospital; Assistant Ophthalmologist and a Chief of Clinic to the German Hospital. 2007 Chestnut St.

1903. Sinclair, John Falconer, M.D., Physician to the Medical Dispensary of the Presbyterian Hospital; Physician to the Philadelphia Orphan Asylum and to the Presbyterian Orphanage; Physician to the Home of the Merciful Saviour for Crippled Children. 4103 Walnut St.

1907. Sinkler, Francis Wharton, A.B., M.D., Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Physician to the Dispensary of the Episcopal Hospital. 220 S. Sixteenth St.

1872. Sinkler, Wharton, M.D., Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Neurologist to the State Asylum for the Chronic Insane of Pennsylvania. 1606 Walnut St.

1902. Siter, E. Hollingsworth, M.D., Instructor in Genito-urinary Diseases in the University of Pennsylvania; Genito-urinary Surgeon to the Philadelphia Hospital; Surgeon-in-Charge of the Genito-urinary Dispensary of the University Hospital; Surgeon to the Dispensary of the Children's Hospital. 2038 Locust St.

ELECTED

1904. Skillern, Penn Gaskill, M.D. 241 S. Thirteenth St.

1895. Slocum, Harris A., M.D., Professor of Gynecology in the Philadelphia Polyclinic; Gynecologist to St. Clement's Hospital for Epileptics. 1900 Chestnut St.

1904. Smith, Allen J., M.D., Professor of Pathology in the University of Pennsylvania; Pathologist to the University Hospital, to the Philadelphia Hospital, and to the State Hospital for the Insane at Norristown, Pa. University of Pennsylvania.

1905. Smith, S. MacCuen, M.D., Professor of Otology in the Jefferson Medical College; Aurist and Laryngologist to the Germantown Hospital; Aurist to the Jewish Hospital; Consulting Aurist to the Oncologic Hospital. 1429 Spruce St.

1895. Spellissy, Joseph M., A.M., M.D., Surgeon to the Outpatient Department of the Pennsylvania Hospital; Visiting Surgeon to St. Joseph's and to the Methodist Episcopal Hospitals; Assistant Surgeon to the Orthopædic Department of the University Hospital. 110 S. Eighteenth St.

1897. Spiller, William G., M.D., Associate Professor of Neurology and Professor of Neuropathology in the University of Pennsylvania; Clinical Professor of Nervous Diseases in the Woman's Medical College of Pennsylvania; Professor of Nervous Diseases in the Philadelphia Polyclinic and College for Graduates in Medicine. 4409 Pine St.

1894. Stahl, B. Franklin, B.S., Ph.G., M.D., Clinical Professor of Medicine in the Woman's Medical College of Pennsylvania; Lecturer on Dietetics of the Sick and Instructor in Physical Diagnosis in the University of Pennsylvania; Visiting Physician to St. Agnes's Hospital; Visiting Physician to the Philadelphia Hospital. 1727 Pine St.

1904. Stanton, William B., M.D., Physician to the Department of Tuberculosis, Philadelphia Hospital; Physician to the Henry Phipps Institute; Visiting Physician to the Free Hospital for Poor Consumptives, White Haven, Pa. 732 Pine St.

1875. Starr, Louis, M.D. 1818 S. Rittenhouse Square.

1898. Steele, J. Dutton, M.D., Associate in Medicine in the University of Pennsylvania; Physician to the University Hospital; Physician to the Presbyterian Hospital. Corner Fortieth and Locust Sts.

1892. Steinbach, Lewis W., M.D., Professor of Clinical and Operative Surgery in the Philadelphia Polyclinic; Visiting

ELECTED

Surgeon to the Philadelphia and to the Jewish Hospitals. 1309 N. Broad St.

1884. Stelwagon, Henry W., M.D., Ph.D., Professor of Dermatology in the Jefferson Medical College; Dermatologist to the Philadelphia and to the Howard Hospitals; Associate Member of the Society of Dermatology and Syphilology of France and of Italy. 1634 Spruce St.

1895. Stengel, Alfred, M.D., Professor of Clinical Medicine in the University of Pennsylvania; Physician to the University, to the Pennsylvania, and to the Philadelphia Hospitals. 1811 Spruce St.

1901. Stevens, Arthur A., M.D., Professor of Pathology in the Woman's Medical College of Pennsylvania; Lecturer on Physical Diagnosis in the University of Pennsylvania; Physician to the Episcopal and St. Agnes's Hospitals. 314 S. Sixteenth St.

1902. Stewart, Francis T., M.D., Professor of Surgery in the Philadelphia Polyclinic and College for Graduates in Medicine; Surgeon to the Germantown Hospital; Assistant Surgeon to the Jefferson Medical College Hospital; Surgeon to the Out-patient Department of the Pennsylvania Hospital. 311 S. Twelfth St.

1898. Stout, George C., M.D., Professor of Otology in the Philadelphia Polyclinic and College for Graduates in Medicine; Laryngologist and Aurist to the Presbyterian Hospital, the Children's Aid Society, and to the William Penn Charter School. 1611 Walnut St.

1884. Stryker, Samuel S., M.D., Physician to the Presbyterian Hospital. 3833 Walnut St.

1900. Swan, John M., M.D., Instructor in Clinical Pathology, and in Tropical Medicine in the Philadelphia Polyclinic and College for Graduates in Medicine. 3713 Walnut St.

1898. Sweet, William M., M.D., Professor of Diseases of the Eye in the Philadelphia Polyclinic; Associate Professor of Ophthalmology in the Jefferson Medical College; Assistant Ophthalmic Surgeon to the Philadelphia Hospital; Consulting Ophthalmologist to the Phœnixville Hospital. 1205 Spruce St.

1906. Tait, Thomas W., M.D., Ophthalmologist to St. Agnes's Hospital and to the Charity Hospital. 320 S. Fifteenth St.

ELECTED

1900. Talley, James Ely, A.B., M.D., Physician to the Out-patient Department of the Presbyterian Hospital; Assistant and Consulting Physician to the Country Branch of the Children's Hospital. 1927 Chestnut St.

1901. Taylor, J. Gurney, M.D., Physician to the Pennsylvania Institution for the Instruction of the Blind. 6041 Drexel Road, Overbrook, Pa.

1886. Taylor, John Madison, A.M. (Princeton), M.D., Editor *Monthly Cyclopedia of Practical Medicine;* Pediatric Physician to the Philadelphia Hospital; Assistant Physician to the Children's Hospital; Consulting Physician to the Elwyn, Pa., and to the Vineland, N. J., Training Schools for Feeble-minded Children. 1504 Pine St.

1887. Taylor, William J., M.D., Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases, and to St. Agnes's Hospital; Consulting Surgeon to the West Philadelphia Hospital for Women. 1825 Pine St.

1886. Taylor, William L., M.D. 1340 N. Twelfth St.

1867. Thomas, Charles Hermon, M.D. 3634 Chestnut St.

1907. Thomas, Thomas Turner, M.D., Instructor in Surgery in the University of Pennsylvania; Assistant Surgeon to the University Hospital; Assistant Surgeon to the Philadelphia Hospital. 2005 Chestnut St.

1897. Thomson, A. G., M.D., Assistant Ophthalmic Surgeon to the University Hospital; Assistant Ophthalmologist to the Orthopædic Hospital and Infirmary for Nervous Diseases. 1426 Walnut St.

1896. Thorington, James, A.M., M.D., Professor of Diseases of the Eye in the Philadelphia Polyclinic; Member of the American Ophthalmological Society; Ophthalmologist to the Vineland and Elwyn Training Schools for Feeble-minded Children. 120 S. Eighteenth St.

1898. Thornton, Edward Q., M.D., Assistant Professor of Materia Medica in the Jefferson Medical College. 922 Spruce St.

1896. Toulmin, Harry, M.D., Assistant Medical Director of the Penn Mutual Life Insurance Company. 925 Chestnut St.

1901. Tucker, Henry, M.D. 2000 Pine St.

†1894. Tunis, Joseph Price, M.D., Assistant Physician to the Nose and Throat Dispensary of the Polyclinic Hospital. 1426 Pine St.

1901. Turner, John B., M.D., Clinical Assistant in the Ophthalmological Out-patient Department of the Jefferson Medical College Hospital. 1525 Christian St.

ELECTED

1866. Tyson, James, A.M., M.D., Professor of Medicine in the University of Pennsylvania and Physician to the Hospital of the University of Pennsylvania; Physician to the Pennsylvania Hospital. 1506 Spruce St.

1897. Tyson, T. Mellor, M.D., Physician to the Philadelphia Hospital; Assistant Physician to the Hospital of the University of Pennsylvania; Physician to the Rush Hospital, to the Philadelphia Lying-in Charity Hospital, and to the Children's Aid Society of Philadelphia. 1506 Spruce St.

1904. Uhle, Alexander A., M.D., Assistant Instructor in Genito-urinary Diseases in the University of Pennsylvania; Assistant Surgeon to the Dispensary for Genito-urinary Diseases, University Hospital; Assistant Genito-urinary Surgeon to the Philadelphia Hospital; Assistant Surgeon to the Dispensary of the German Hospital. 1327 Jefferson St.

1907. Ullom, Josephus Tucker, A.B., M.D., Member of the Staff of the Henry Phipps Institute for Tuberculosis. 24 Carpenter St., Germantown.

1873. Van Harlingen, Arthur, Ph.B. (Yale), M.D., Emeritus Professor of Diseases of the Skin in the Philadelphia Polyclinic; Dermatologist to the Children's Hospital. 1831 Chestnut St.

1903. Van Pelt, William Turner, M.D., Ophthalmic Surgeon to the Episcopal Hospital. 1528 Spruce St.

1893. Vansant, Eugene Larue, M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Visiting Physician to the Throat, Nose, and Ear Department of the Howard Hospital. 1929 Chestnut St.

1897. Veasey, Clarence A., A.M., M.D., Assistant Professor of Ophthalmology in the Jefferson Medical College, and Assistant Ophthalmologist to the Jefferson Medical College Hospital; Ophthalmic Surgeon to the Methodist Episcopal Hospital, and to the Church Home for Children; Consulting Ophthalmologist to the Philadelphia Lying-in Charity. 1833 Chestnut St.

†1883. Vinton, Charles Harrod, M.D. Wernersville, Berks County, Pa.

ELECTED

1903. Wadsworth, William Scott, M.D. The Normandie, Thirty-sixth and Chestnut Sts.

1885. Walker, James B., M.D., Ph.D., Consulting Physician to the West Philadelphia Hospital for Women and Children. 1617 Green St.

1906. Walker, John K., M.D., Physician to the Dispensary of the Mary J. Drexel Home. 1632 Spruce St.

1907. Walker, Warren, M.D., Surgeon to the Dispensary of the Episcopal Hospital; Surgeon to the Dispensary of the Children's Hospital; Assistant Surgeon in the Clinic for Genito-urinary Diseases of the Polyclinic Hospital. 1632 Spruce St.

1904. Walsh, Joseph, A.M., M.D., Physician to the Henry Phipps Institute; Visiting Physician to the White Haven Sanatorium; Physician to the Department of Tuberculosis at the Philadelphia Hospital. 732 Pine St.

1893. Warren, Joseph W., M.D., Associate Professor of Physiology in Bryn Mawr College. Bryn Mawr, Pa.

1895. Watson, Arthur W., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Laryngologist to the Howard Hospital, and to the Hospital for Diseases of the Lungs, Chestnut Hill. 126 S. Eighteenth St.

1886. Watson, Edward W., M.D., Physician to the Magdalene Home. 38 S. Nineteenth St.

1903. Weber, Charles H., M.D., Physician to the Episcopal Hospital; Physician to the Dispensary of the Children's Hospital. 1304 Pine St.

1906. Weisenburg, Theodore H., M.D., Professor of Neuropathology and Associate Professor of Neurology in the Medico-Chirurgical College; Associate in Neurology in the Philadelphia Polyclinic; Neurologist to the Philadelphia Hospital. 2030 Chestnut St.

1883. Welch, William M., M.D., Physician-in-Charge of the Municipal Hospital for Contagious Diseases; Consulting Physician to the Northern Dispensary and to the Northern Home for Friendless Children. 1411 Jefferson St.

1897. Wells, William H., M.D., Demonstrator of Clinical Obstetrics in the Jefferson Medical College; Assistant Obstetrician to the Jefferson Maternity; Visiting Gynecologist to the Mt. Sinai Hospital. 1105 Spruce St.

1893. Westcott, Thompson S., M.D., Associate in Diseases of Children in the University of Pennsylvania; Visiting

ELECTED

Physician to the Methodist Episcopal Hospital; Assistant Physician to the Children's Hospital; Pediatrist to the Jewish Hospital. 1720 Pine St.

1884. Wharton, Henry R., M.D., Clinical Professor of Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Presbyterian and to the Children's Hospitals; Consulting Surgeon to the Bryn Mawr Hospital, to St. Christopher's Hospital for Children, and to the Pennsylvania Institution for the Deaf and Dumb. 1725 Spruce St.

1901. White, Courtland Y., M.D., Lecturer on and Demonstrator of Gross Morbid Anatomy in the Veterinary Department of the University of Pennsylvania; Pathologist to the State Live Stock Sanitary Board, to the Children's and to St. Joseph's Hospitals, and to the Henry Phipps Institute. 334 S. Sixteenth St.

1878. White, J. William, M.D., Ph.D., John Rhea Barton Professor of Surgery in the University of Pennsylvania; Surgeon to the University Hospital; Fellow of the American Surgical Association and of the American Association of Genito-urinary Surgeons. 1810 S. Rittenhouse Square.

1905. Whiteway, Harold M., M.D. 1924 Chestnut St.

1898. Whiting, Albert D., M.D., Surgeon to the Germantown Hospital; Assistant Surgeon to the German Hospital; Surgeon to the Southern Home for Destitute Children; Surgeon to the Out-patient Department of the German Hospital. 1523 Spruce St.

†1880. Willard, De Forest, A.M., M.D., Ph.D., Professor of Orthopedic Surgery in the University of Pennsylvania; Surgeon-in-Chief to the Widener School; Consulting Surgeon to the Presbyterian, to the Germantown, to the Jewish, to the Atlantic City, and to the Phœnixville Hospitals. 1818 Chestnut St.

1907. Williams, Carl, B.S., M.D., Assistant Ophthalmic Surgeon to the Germantown Hospital; Assistant Surgeon to the Dispensary for Diseases of the Eye at the University Hospital. 5909 Germantown Ave.

1878. Williamson, Jesse, M.D., 8708 Germantown Ave., Chestnut Hill.

1902. Willson, Robert N., Jr., M.D., Instructor in Physical Diagnosis, and Students' Physician in the University of Pennsylvania. 1708 Locust St.

ELECTED

1881. Wilson, H. Augustus, M.D., Professor of Orthopedic Surgery in the Jefferson Medical College; Emeritus Professor of Orthopedic Surgery in the Philadelphia Polyclinic; Consulting Orthopedic Surgeon to the Philadelphia Lying-in Charity Hospital, and to the Kensington Hospital for Women; Senior Orthopedic Surgeon to the Philadelphia Hospital. 1611 Spruce St.

1874. Wilson, James C., A.M. (Princeton), M.D., Professor of the Practice of Medicine and of Clinical Medicine in the Jefferson Medical College, and Physician to the Hospital of the same (Faculty Staff); Physician-in-Chief to the German Hospital; Attending Physician to the Pennsylvania Hospital. 1509 Walnut St.

1902. Wilson, Samuel M., M.D. 1517 Arch St.

1897. Wilson, W. Reynolds, M.D., Visiting Physician to the Philadelphia Lying-in Charity Hospital. 1709 Spruce St.

1904. Wister, James W., M.D., Physician to the Out-patient Department of the Germantown Hospital. 5430 Main St., Germantown.

*1901. Witmer, A. Ferree, M.D. 78 W. Eighty-second St., New York.

1893. Wood, Alfred C., M.D., Assistant Professor of Surgery in the University of Pennsylvania; Assistant Surgeon to the University Hospital; Surgeon to the Philadelphia and to St. Timothy's Hospitals. 128 S. Seventeenth St.

1900. Wood, George B., M.D., Instructor in Laryngology in the University of Pennsylvania; Assistant in the Clinic for Diseases of the Nose and Throat at the Polyclinic Hospital. 129 S. Eighteenth St.

1865. Wood, Horatio C., M.D., LL.D. (Yale and Lafayette), Emeritus Professor of Materia Medica and Therapeutics in the University of Pennsylvania; Associate Fellow in Medicine and Surgery of the American Academy of Arts and Sciences; Member of the National Academy of Science. 4107 Chester Ave.

1903. Wood, Horatio C., Jr., M.D., Demonstrator of Pharmacodynamics in the University of Pennsylvania; Assistant Physician to the Philadelphia Hospital. 3942 Walnut St.

1907. Wood, Walter A., M.D. 1715 Spruce St.

1880. Woodbury, Frank, M.D., Secretary to the Committee on Lunacy of the Board of Charities of Pennsylvania. 218 S. Sixteenth St.

ELECTED

1866. Woods, D. F., M.D., Physician to the Presbyterian Hospital. 1501 Spruce St.

1901. Woods, Richard F., M.D., Assistant Surgeon to the Gynecean Hospital. 1501 Spruce St.

1888. Woodward, Charles E., M.D., Secretary of the West Chester Board of Health; U. S. Examining Surgeon; Member of the Medical Staff of the Chester County Hospital. West Chester, Pa.

†1897. Woodward, George, M.D. W. Willow Grove Ave., Chestnut Hill, Philadelphia.

1903. Worden, Charles B., M.D., Associate in Diseases of the Stomach and Intestines in the Philadelphia Polyclinic; Physician to the Dispensary of the Presbyterian Hospital; Anesthetizer to the Orthopedic Department of the University Hospital; Physician to the Presbyterian Orphanage. 4208 Walnut St.

1889. Young, James K., M.D., Professor of Orthopedic Surgery in the Philadelphia Polyclinic; Clinical Professor of Orthopedic Surgery in the Woman's Medical College of Pennsylvania; Associate in Orthopedic Surgery in the University of Pennsylvania and Assistant Orthopedic Surgeon to the University Hospital. 222 S. Sixteenth St.

1894. Zentmayer, William, M.D., Attending Surgeon to the Wills Eye Hospital; Ophthalmic Surgeon to St. Mary's Hospital; Ophthalmologist to the House of Refuge. 1819 Spruce St.

1899. Ziegler, S. Lewis, A.M., M.D., Sc.D., Attending Surgeon to the Wills Eye Hospital; Ophthalmic Surgeon to St. Joseph's Hospital; Membre Société Française d'Ophtalmologie. 1625 Walnut St.

1887. Ziegler, Walter M. L., A.M., M.D. 1418 N. Seventeenth St.

1895. Zimmerman, Mason W., M.D., Consulting Ophthalmic Surgeon to the Germantown Hospital. 1522 Locust St.

ASSOCIATE FELLOWS.

[Limited to Fifty, of whom Twenty may be Foreigners.]

American.

ELECTED

1876. Billings, John S., M.D., U. S. A., Astor Library Building, 40 Lafayette Place, New York City, New York.

1886. Bowditch, Henry P., M.D., 688 Boylston Street, Boston, Massachusetts.

1877. Chaille, Stanford E., M.D., University Building, New Orleans, Louisiana.

1886. Cheever, David W., M.D., 557 Boylston Street, Boston, Massachusetts.

1896. Conner, Phineas Sanborn, M.D., 215 West Ninth Street, Cincinnati, Ohio.

1893. Councilman, William T., M.D., Harvard Medical College, Boston, Massachusetts.

1892. Emmet, Thomas Addis, M.D., 91 Madison Avenue, New York City, New York.

1892. Fitz, Reginald H., M.D., 81 Arlington Street, Boston, Massachusetts.

1895. Fletcher, Robert, M.D., Army Medical Museum, Washington, D. C.

1903. Gorgas, William C., M.D., U. S. A., Washington, D. C.

1891. Jacobi, A., M.D., 19 East Forty-seventh Street, New York City, New York.

1906. Mayo, William J., M.D., Rochester, Minn.

1895. McBurney, Charles, M.D., 28 West Thirty-seventh Street, New York City, New York.

1906. Pilcher, Lewis Stephen, M.D., 386 Grand Avenue, Brooklyn, New York.

1886. Reeve, John C., M.D., LL.D., S. W. corner Third and Wilkinson Streets, Dayton, Ohio.

1886. Senn, Nicholas, M.D., 532 Dearborn Avenue, Chicago, Illinois.

1906. Shattuck, Frederick C., M.D., 135 Marlborough Street, Boston, Massachusetts.

1896. Sternberg, George M., M.D., U. S. A., 1019 Sixteenth Street, N. W., Washington, D. C.

1896. Tiffany, L. McLane, M.D., 831 Park Avenue, Baltimore, Maryland.

ELECTED

1894. Warren, J. Collins, M.D., 58 Beacon St., Boston, Massachusetts.

1894. Weir, Robert F., M.D., 11 East Fifty-fourth Street, New York City, New York.

1892. Welch, William H., M.D., Johns Hopkins Hospital, Baltimore, Maryland.

Foreign.

1890. Baccelli, Guido, Rome, Italy.

1894. Brunton, Sir T. Lauder, M.D., 10 Stratford Place, London, W., England.

1903. Finlay, Charles J., M.D., Havana, Cuba.

1899. Fraser, Thomas R., M.D., LL.D., F.R.C.P., F.R.S., 13 Drumsheigh-Gardens, Edinburgh, Scotland.

1903. Horsley, Sir Victor Alexander Haden, F.R.S., 25 Cavendish Square, London, England.

1906. Hutchinson, Jonathan, M.D., LL.D., F.R.S., 15 Cavendish Square, London, W., England.

1896. Jaccoud, Prof. S., Rue Tronchet 35, Paris, France.

1894. Jackson, J. Hughlings, M.D., 3 Manchester Square, London, England.

1893. von Jaksch, Rudolf, M.D., Prague, Bohemia.

1903. Kocher, Prof. Theodor, M.D., Berne, Switzerland.

1896. Leyden, Ernst, M.D., Berlin, Germany.

1877. Lord Lister, M.D., LL.D., F.R.S., 12 Park Crescent, Portland Place, London, W., England.

1906. Myles, Sir Thomas, M.D., 33 Merion Square, W., Dublin, Ireland.

1896. Pye-Smith, P. H., M.D., 48 Brook St., London, W., England.

1898. Roddick, Thomas G., M.D., 80 Union Avenue, Montreal, Canada.

1907. Terrier, Felix, Rue Solférino, 11, Paris, France.

1869. Valcourt, Th. de, M.D., Cannes, France.

1904. Waldeyer, Prof. Wilhelm, M.D., Berlin, Germany.

CORRESPONDING MEMBERS.

1880. Carrow, Flemming, M.D., Washington Arcade, Detroit, Michigan.

1880. Chiara, Domenico, M.D., Florence, Italy.

1886. Dey, Kanny Lall, M.D., Calcutta, India.

1885. Rendu, Jean, M.D., Lyons, France.

NECROLOGICAL LIST.

FELLOWS.

C. PERCY LA ROCHE (n. r.),	March	12, 1907
JOHN H. BRINTON,	March	18, 1907
JOHN H. PACKARD,	May	21, 1907
CHARLES E. CADWALADER (n. r.),	June	12, 1907
JAMES W. MACINTOSH,	June	24, 1907
FRANK H. GETCHELL,	June	27, 1907
CHARLES H. BOARDMAN (n. r.),	July	16, 1907
WILLIAM THOMSON,	August	3, 1907
CHARLES STEWART WURTS,	August	13, 1907
WILLIAM G. B. HARLAND,	September	14, 1907
J. HENRY C. SIMES,	September	28, 1907
WILLIAM H. NOBLE,	October	15, 1907
WILLIAM MOSS,	October	30, 1907

ASSOCIATE FELLOWS.

N. S. DAVIS,	June	15, 1904
ROBERT BARNES,	May	12, 1907
SIR JOSEPH FAYRER,	May	21, 1907

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MEMOIR OF FREDERICK A. PACKARD, M.D.[1]

By CHARLES W. BURR, M.D.

Frederick A. Packard was born on November 17, 1862. He was the son of Dr. John H. and Elizabeth Wood Packard. He graduated from the College Department of the University of Pennsylvania in 1882, and from the Medical School in 1885. When he was given his degree in medicine he received the medal for the highest general average, the second award in the demonstrators' prize, and honorable mention for his thesis. He served as resident physician in the University and Pennsylvania Hospitals. Three years after graduation he was offered the position of chief assistant resident physician in Johns Hopkins Hospital, but declined the appointment, preferring to enter upon private practice. He soon began to get hospital appointments, and while still a young man was elected visiting physician to the Children's, Philadelphia, Episcopal, and Pennsylvania Hospitals. During the greater part of his medical life he was a member of the teaching staff of the University of Pennsylvania, and shortly before his death was elected a trustee.

The time when he studied medicine was one of transition in methods of teaching and of great scientific unrest. The relation of microörganisms to disease, accepted here and there by wise and far-seeing men, had not become a part of the orthodox dogma of medicine; on the contrary, he was taught sneeringly by one professor that "bugs" had nothing to do with the causation of disease, by another that it was a proved fact, and by a third that in such questions scientific skepticism was a wise attitude of mind. Pathology

[1] Read January 2, 1907.

was still almost synonymous with morbid anatomy, and the newer chemical pathology was only beginning to be dreamed of in the minds of geniuses who, as is usual, were first scorned, then sneered at, then quarrelled with in serious fashion, and finally hailed as great men. The methods of instruction were much more didactic and dogmatic than today and bedside instruction was much less thorough. Practical work in the laboratories was given less time than now.

The faculty at the University was very strong and all its members have taken their places in the history of American medicine. I think of all his teachers, Dr. Osler had the greatest influence on his mental development. Teachers in those days had one great advantage so far as student reputation is concerned. We rarely were able to follow the patients lectured on to the postmortem table—the great breaker down of supposed infallibility—and we did not always see the patient after the operation unless it was a success. Today some of us fear students are able to follow patients too closely to the end. In all methods of instruction, the students of today are better off than we were, though today, as then and always, many men are crying that there is too much scientific and not enough practical instruction, really meaning that teaching by rule of thumb is better than teaching principles. One of the greatest advances has been in the training of men to be teachers and not merely practitioners who teach as an incident in their lives. There were then only two men in the faculty who did not practice, and in many colleges there were none.

Much can be foretold of the future of a young physician living in a city by the medical societies he joins and the interest he takes in their work. Dr. Packard, in 1885, joined the Pathological Society, which for years has been the training school for young men in scientific medicine in this city. He was one of a group of young men who, knowing but little of pathology, still were vitally interested in the science of medicine, and determined to learn all they could for mere learning's sake. He was a constant attendant at its meetings, had a strong personal interest in its welfare, and worked hard for its success. It was he, I think, who instituted

the custom of annual exhibition meetings. He was Secretary for several years, and President from October, 1899, until October, 1901. He was one of the founders of the Philadelphia Pediatric Society in 1896, and later became its President. Probably his most important work in the society was the large part he took in carrying on the work of the milk commission. He was elected a Fellow of the College in 1890; served as a member of several of its committees, and did especially good work as a member of the Committee on the Mütter Museum. He was chairman of the Section on General Medicine at the time of his death. He early joined the County Medical Society, the Philadelphia Neurological Society, the State Medical Society, and the American Medical Association. He was also a member of the Association of American Physicians and of the American Pediatric Society. He was Secretary of the latter for several years, and was made a member of its Council.

Dr. Packard was far above the average in mental power. His tastes and inclinations were toward the study of the natural sciences, and from his point of view, medicine was a natural science and should be so studied. He sought hospital appointments for the opportunity of study, and for that only. He wrote a great deal, and all that he wrote was worth the doing. He knew what many men who write do not know—how to write clear, simple idiomatic English.

He was an excellent teacher. He lectured quietly, clearly, without any attempt at oratory, and with entire absence of the bearing which says so plainly, "Behold what a great man I am!" In ward-class teaching he was especially successful, because he always remained young enough to appreciate the student's point of view and to understand the strange mental processes by which they make such curious and out-of-the-way mistakes in reasoning. He knew how to teach men to see what they look at. Students admired him for his intellectual honesty. His influence on them both as man and teacher was great.

After all, the chief duty of physicians is to care for the sick. For this, tact and kindness and wisdom are quite as necessary as skill.

Dr. Packard had all the needed qualities. His smile and bright face did as much good as his medicine. He gave hope, not so much in words, as in bearing and manner and by his strong personal charm. His patients loved the man as much as they respected the physician.

He had a singular charm of personality. Men meeting him once wished to meet him again. Acquaintances wanted to become his friends. He was gentle and quiet in manner and yet no weakling. He was an optimist, and looked for good in men rather than evil. There were, doubtless, men whom he disliked; there was probably none whom he hated. He was careful in his speech and slow to criticise adversely. His honesty was absolute and honor life to him.

For a man to whom death came so early he had attained a high position, and all that he got came cleanly. He never bowed the head in the house of Rimmon nor worshipped at the shrine of Baal. He was not a politician, running at the heels of men, bowing, scraping, and fawning, in the hope some favor would fall to him, but a true man, erect, quiet, self-contained, and self-respecting.

His private life, like the annals of a happy country having no history, was uneventful and without any tragedy. He married Katherine P. Shippen, daughter of Dr. Edward Shippen, June 1, 1893. He died of typhoid fever at the Pennsylvania Hospital, November 1, 1902.

I have spoken no evil of this man because I know none. I knew him well, and knew him to be sincere, just, clear-minded, clean-hearted, a friend faithful and true. His influence for good was great, and it will last as long as any of us here to-night shall live. Why men such as he should die at the very time their abilities have ripened, at the very time that they are beginning to be a power and of use, whilst worthless men survive, is a question men have asked since thought began and never answered. Nature is prodigal and penurious, careless and careful, slays and spares irrespective of worth or worthlessness. We can only hope that seeming evil may be real good, and that the power behind the appearances of things, that made the universe and rules it, knows best.

MEMOIR OF WILLIAM S. FORBES, M.D.[1]

By FREDERICK P. HENRY, M.D.

It would have been characteristic of the subject of this memoir if, on being consulted concerning its character and scope, he had replied in the words of Othello:

> "Speak of me as I am; nothing extenuate,
> Nor set down aught in malice."

This is what I propose to do, and it is a congenial task, for after a careful review of his life, and especially of that period of storm and stress which many here present can recall, I have found nothing to extenuate. As to malice, there is little likelihood of that from one who was his own familiar friend in whom he trusted.

In preparing this memoir I have become more firmly established in an opinion that I have often expressed: viz., that it is the duty of every man to bequeath to his family a personal record of the principal events of his life. Such documents are rare and are often more highly prized by their fortunate possessors than any amount of so-called personal or real estate. There are certain episodes of Dr. Forbes' life, notably his student days in this city, the circumstances attending his election as resident physician to the Pennsylvania Hospital, and his voyage to the Crimea, concerning which no one but himself could give complete details. Time and again he has spoken of them to me, perhaps more fully than to anyone else, and I now regret that they were not more deeply impressed upon my memory. Even if I had foreseen that I would be chosen to act as his biographer I could not have played the part of Boswell:

[1] Read January 2, 1907.

a species of character which, in my opinion, is incapable of true, *i. e.*, disinterested friendship.

William Smith Forbes was born at Falmouth, Stafford County, near Fredericksburg, Virginia, on the tenth of February, 1831, and was the son of the late Murray Forbes and Sallie Innes (Thornton) Forbes. His grandfather, the first of the family to come to America, was Dr. David Forbes, of Edinburgh (of the Bitsligo branch of Forbes), who married in 1774 and settled in Dumfries, Virginia. His wife was Margaret Stirling, of Dunbarton Castle on the river Clyde, and, as I am informed by Mr. David Forbes, of Fredericksburg, Va., her family possess letters from James V of Scotland, written, in 1534, to William Stirling, and from Mary, Queen of Scots, in 1545, to George Stirling, expressing their thanks for its successful defence. Through his mother, Sallie Innes Thornton, the subject of this memoir was descended from a family that had been established in America since the year 1657.

Dr. Forbes never spoke to me of his ancestry. He was not a man to make parade of crests and coats of arms, and although a believer in pedigree, as everyone must be who has observed its influence throughout the entire animal kingdom, he set manhood above it, and held with the national poet of Scotland that

> "The rank is but the guinea's stamp.
> The man's the gowd for a' that!"

Dr. Forbes received his early educational training at the Fredericksburg and Concord Academies, in which he was well grounded in the classics. He began his medical studies under Dr. George Carmichael and attended medical lectures at the University of Virginia, in 1850–51. He completed his medical course at the Jefferson Medical College, Philadelphia, and while attending lectures, was an office student of the late Dr. Joseph Pancoast, at that time Professor of Anatomy in the same institution. In 1852 he received his medical degree. I have no record of the interval between his graduation, in the spring of 1852, and the date of his election to the post of resident physician to the Pennsylvania Hospital, which was September 26, 1853. He served as interne in the Pennsylvania Hospital until about the end of March, 1855.

In the Hospital minutes of March 26, 1855, there is a note to the effect that he was voted a Testimonial, which was sealed with the Hospital seal and delivered to him. This Testimonial, or Diploma, was probably identical with that which is still given to internes who have completed their terms of service to the satisfaction of all concerned, and is ranked among the most valuable documents in their possession. After completing his service at the Pennsylvania Hospital, Dr. Forbes went abroad to study military surgery. The schools for such study are, fortunately for mankind, not in continuous session, but, in 1855, a very successful one was in operation in connection with the Crimean war. To it Dr. Forbes repaired, and served as surgeon in the English Military Hospital, at Scutari.

He has told me of the obstacles he encountered in obtaining the official credentials which were absolutely necessary to the success of his undertaking and how he overcame them, but, in the absence of other evidence than that supplied by my memory, I cannot enter into the details of this interesting episode. If he had been endowed with that "mystical lore" which the poet attributes to the "sunset of life," in virtue of which coming events are anticipated, he could not have more wisely ordered his actions at this period. It is true that the shadow of coming war was even then upon our land, but it was so faint and small that the wisest of our statesmen scarcely perceived it, and, several years later, when it loomed much darker and more threatening, none recognized its full significance. It is not to be supposed, for a moment, that, in 1855, a young American doctor just out of College, deliberately planned to prepare himself for work on battle-fields shortly to be waged in his own country, but, as already stated, if he had been endowed with the gift of prophecy he could not have acted more wisely.

In recognition of his services in the Crimea, Dr. Forbes was offered a position in the Surgical Corps of the British Army, but declined it because its acceptance involved the renunciation of his citizenship in the United States.

On his return from Europe, he opened a private school of anatomy and operative surgery at the southeast corner of Tenth

Street and College Avenue, now Chant Street, which was largely attended by Southern students. It was suspended during the war, but reopened at its close and continued until 1870.

On March 14, 1866, Dr. Forbes received the degree of M.D. from the University of Pennsylvania, the subject of his graduating thesis being "On the Treatment of the Wounded Men of the 13th Army Corps during the Siege of Vicksburg." He held an honorable record for services during the Civil War. They are summed up in the following quotation from a circular issued by the Military Order of the Loyal Legion of the United States in memory of their dead companion:

"When the War of the Rebellion broke out, he entered the medical service as Acting Assistant Surgeon, being detailed with Dr. J. H. B. McClellan and Dr. Edward Hartshorne to examine certain candidates desiring to enter the military service. In 1862 he was appointed Surgeon U. S. Volunteers, with the rank of Major, and was assigned to duty as Surgeon of the Port of Philadelphia. He served as Medical Director of the 13th Army Corps until 1863, when he resigned. Afterward he was appointed a Contract Surgeon in charge of the Summit Hospital in Philadelphia. In all military positions he conducted himself with credit, so as to be favorably regarded not only by men of his own profession, but also by his commanding officers."

As this is not intended to be a complete biography, I shall not enter into the details of work performed by Dr. Forbes in the various positions he occupied, the most important of which are the following: Surgeon to the Hospital of the P. E. Church, 1862–1887; Demonstrator of Anatomy in the Jefferson Medical College, 1879–1886; Professor of Anatomy and Clinical Surgery in the Jefferson Medical College, 1886 to the time of his death.

That part of his work in which the Fellows of the College of Physicians are most interested and by which he will be longest remembered is to be found in his contributions to medical science. He was not a voluminous writer. Judging from his published papers, one might suppose him to have made the rule never to write unless he had some hitherto unnoticed fact to announce or

some new idea to suggest. Such a rule, if enforced, would suppress a large percentage, perhaps the major part, of so-called medical literature: a consummation devoutly to be wished from every standpoint except that of the tradesman. Few though his papers are, they are all suggestive and would all repay a careful study. A review of each of them would be out of place in this memoir, but a brief reference to some of the most important seems to me imperative.

The most interesting and, in its results, the most important of Dr. Forbes' publications is his "History of the Anatomical Act of Pennsylvania," "prepared in accordance with the request of the W. S. Forbes Anatomical League of Jefferson Medical College." It is not only interesting as a narrative of the events which culminated in the passage of the Act in question, but as showing incidentally, though necessarily and in the most modest manner possible, the part taken by himself in placing the study of anatomy on a legitimate and orderly basis.

On February 6, 1867, at a stated meeting of this College, Dr. Forbes offered the following resolution: "Resolved, That a committee of three be appointed to present the views of this College to the Legislature of the State, urging the passage of a law sanctioning the dissection of dead human bodies."

At that time Dr. Forbes had been teaching anatomy and operative surgery in this city for ten years to classes numbering, in the aggregate, more than one thousand students, and, to use his own words, "might be supposed to know something of the difficulties in the way of obtaining sufficient material for practically teaching so large a number of young gentlemen."

In his remarks upon his resolution he speaks of the "degrading traffic" in dead bodies which was encouraged by the non-existence of such an Act as he had drawn up for presentation to the Legislature, and it is a singular and ironical fact that, about fifteen years later, he should be falsely accused of engaging in this very "traffic" which he had stigmatized as "degrading" and did his best to suppress.

Dr. Forbes read the Act which he proposed to submit to the

Legislature and which had already been defeated by that body when presented by him during the preceding winter. It was because of this defeat that he asked for its sanction by the College and the appointment of a committee to present it for the second time.

The resolution was unanimously passed and the following committee appointed:

Dr. W. S. Forbes, Dr. S. D. Gross, Dr. D. Hayes Agnew. Subsequently, Dr. Henry Hartshorne was substituted for Dr. Gross who, because of "professional and other engagements," was unable to accompany the committee to Harrisburg. Without entering into details, it will suffice to state that this committee accomplished its work in the most energetic and efficient manner. Three visits to Harrisburg were made, and on April 3, 1867, Dr Forbes reported to the College that the Act which he had read before that body on February 6, had been signed by Governor Geary on March 18.

In a few years difficulties arose concerning the distribution of unclaimed bodies, difficulties with the Coroner who "owned and conducted at this time the Philadelphia School of Anatomy." In an editorial in the *Medical News* for December 9, 1882, entitled "Body Snatching," it is stated that the "law of 1867 directs that unclaimed bodies shall be delivered to the medical colleges for dissection in proportion to the number of their students. Why then," the writer inquires, "should there exist any cause for body snatching? The chief cause," he replies, "is because the Coroner of this city persistently disregards and disobeys the law." He then proceeds to say that he has "the best authority for stating that the Jefferson Medical College has, in several years, received less than a dozen subjects from the Coroner while his own private rooms for anatomical instruction have had an abundant supply."

It is evident that this editorial was not written, or inspired, by Dr. Forbes, for its quotation of the Act of 1867 is fundamentally incorrect.

At a meeting of the Association of Anatomists, held at the College of Physicians during the last week of 1882 for the purpose of revising and extending the Act of 1867, Dr. Forbes moved that the

words "give permission" be stricken out and the word "deliver" be substituted, so that the Act would read "that Coroners (and other mentioned officials) shall deliver such body or bodies," etc. The Coroner, who was present at the meeting, objected, but the resolution was carried and the words "shall deliver" are now contained in the Act signed by Governor Pattison on June 13, 1883.

In December, 1882, occurred the most tragic event in the life of Dr. Forbes: his arrest for complicity in the crime of robbing the graves in Lebanon Cemetery of the bodies of the dead. It is a significant fact that he does not mention the day of his arrest in the only place in which I have seen his personal reference to it. He says that it occurred in December, 1882. That was sufficiently precise. He evidently wished to blot out the memory of this terrible day as Job, in the bitterness of his heart, would have blotted out the day of his birth.

The charge of which Dr. Forbes was triumphantly acquitted was, in its nature and possible consequences, calculated to warp and embitter the most genial disposition, and it is possible that it may have had temporarily some such effect upon him. He soon, however, lived down both the false accusation and its effects upon himself, and I have heard him describe the whole affair from beginning to end in his customary judicial, not to say didactic, manner, precisely as though he were the attorney for the defence and the prisoner a creature of the imagination. I need scarcely add that everyone connected with the prosecution, directly or indirectly, received the severest possible castigation. It was many years, however, before this state of mind became habitual. In his history of the Anatomical Act, Dr. Forbes makes a brief but pathetic reference to the sufferings he endured. Speaking of the newspapers and their vindictiveness, whether real or assumed, he remarks: "The contumely thus cast at me injured me in many ways, and, sad enough, it alienated certain friends who were near to me." Such friends could not have been so near as he supposed. One of the sweetest "uses of adversity" is the opportunity it affords to friendship. The maxim that there is something in the misfor-

tune of our best friends that is not displeasing to us,[1] finds a verification that probably never was dreamed of by the cynic who framed it. The warm-hearted man rejoices not at the misfortune of his friend, but at the opportunity to serve him. Much has been said and written concerning the ingratitude of friends and the folly of friendship, and most of it is unjustified. We all expect too much and give too little. The question which each man should put to himself when moralizing *de Amicitia* is not how many friends could I rely on in the day of adversity? but how many of those who regard me as their friend could rely upon me? This is the supreme test, and as there were many, both within and outside of the profession, who could rely upon Dr. Forbes, it was inevitable that he should find many staunch adherents. With these to encourage him whose adoption was tried and whom he grappled to his soul with "hooks of steel," he entered upon the best years of his life. About three years later, in 1886, he received, in his election to the Professorship of Anatomy and Clinical Surgery in the Jefferson Medical College the highest possible endorsement of his character and abilities. Through the additional revenue derived from this post he was enabled to devote himself almost exclusively to the work he best loved—that of the teacher. The "practice" of his profession was, with him, as it should be with everyone who occupies a Chair in a medical school, subordinate to his collegiate duties.

In April, 1878, in commemoration of the tricentennial anniversary of Harvey's birth, which was on April 1, 1578, Dr. Forbes read before this College a paper entitled "Harvey and the Transit of the Blood from the Arteries to the Veins 'per Porositates.'" It is a learned argument in favor of the view that Harvey was acquainted with the capillary system of bloodvessels and is entirely based upon the derivation of the word "porositates," which Harvey employs to designate the channels through which the blood passes from the arterial to the venous side of the circulation. After a careful study of this paper, together with several others upon

[1] "Dans l'adversité de nos meilleurs amis nous trouvons souvent quelque chose qui ne nous déplait pas." La Rochefoucauld, maxime No. 241.

Harvey and his discovery, to say nothing of the original text, I have come to the conclusion that while Harvey may have surmised the existence of an intermediate set of vessels between the arteries and the veins—the so-called capillaries—he did not, in the true sense of the word, *discover* them. This honor was reserved for Malpighi, who, with the aid of the compound microscope, saw the blood corpuscles pass through vessels of extreme tenuity from the arteries into the veins. Dr. Forbes' argument would convince anyone who was an etymologist and not a physiologist, but as he himself was both, it seems evident that he was biased by his enthusiastic admiration of the immortal Harvey.

I shall refer specifically to but two other papers of Dr. Forbes. The first of these, entitled "The Removal of Stone in the Bladder," was read at the meeting of the American Surgical Association at Washington on June 1, 1894. In it he describes a new lithotrite, and demonstrated by means of an ingenious apparatus designed by his son, Mr. John S. Forbes, mechanical engineer, the measured crushing resistance of vesical calculi and the measured strength of the new instrument. It is the most elaborate of Dr. Forbes' papers, and contains in tabulated form the results of experiments upon 184 vesical calculi. It is certainly one of the most interesting and valuable contributions that has been made to the subject of lithotrity.

The last paper to which I shall refer is entitled "Liberation of the Ring-finger in Musicians by Dividing the Accessory Tendons of the Extensor Communis Digitorum Muscle." It was read before the Philadelphia County Medical Society, on January 12, 1898, and is a continuation of a paper read before the same society on November 12, 1884. The best judges of the success of this operation are, of course, the musician operated upon and his instructor, and there is abundant testimony in its favor from both of these sources. Mr. Richard Zeckwer, the director of the Philadelphia Musical Academy, in speaking of its effects, says that one of his pupils upon whom Dr. Forbes operated, gained in a quarter of an hour what he, himself, had not accomplished after twenty-five years' practice. Before the operation, he, the pupil, "could raise

the finger a quarter of an inch; after it, an inch and a quarter, a gain of a whole inch in a few minutes."

I have selected these papers for special notice because they seem to me best fitted to display the versatility of Dr. Forbes' talents, his erudition, and his power of minute and prolonged investigation. Another biographer might select others for the same reasons and find them equally adapted to his purpose.

Some idea of the character of a man may often be obtained from the internal evidence of his writings, provided these are not strictly limited to scientific subjects; for, as a matter of course, nothing in the direction indicated could be deduced from a treatise on quadratic equations or the differential calculus. It would not be difficult for a discerning critic to perceive that Dr. Forbes' papers were written by one with a strong sense of rectitude, a corresponding hatred of injustice, a warm heart and, perhaps, an overweening partiality for his friends. The last-mentioned trait is most plainly evident in his treatise on Harvey, which is practically an attempt to confer upon the immortal physiologist an honor to which the best authorities upon the subject believe he was not entitled.

No matter how fully the character of a man may be revealed by his writings, nothing from this source can be deduced concerning his personality. With regard to this I will merely say that it was such as

"To give the world assurance of a man."

His full-length portrait presented by the alumni of the two great medical schools from which he was graduated, hangs in the anatomical theatre of Jefferson Medical College, and it is to be hoped that at some day in the near future a copy of it will be added to the portraits which adorn our walls.

There is, in our language, a word that has been so much abused and misapplied that it is likely to become obsolete, and yet it is the word which everyone who knew him inevitably associates with Dr. Forbes. It has no synonym, but requires, for its definition, a concrete example. We all immediately recognize that which the wisest cannot define. It is the word "gentleman," and Dr. Forbes was one of its truest exemplars. Ever courteous and considerate

in his relations to all, high and low, rich and poor, with, at the same time, a proper sense of the dignity of his social and professional standing, his manner was such as to repel the familiarity of the chance acquaintance and invite the confidence of his friends. It was no surface polish. I have seen him under the most various circumstances, and whether presiding as a genial host at his own table or suffering, with stoical fortitude, the severest pangs that afflict the human frame, he was a model for imitation. In the hour of death he was serene and undismayed and was literally

> "Like one who wraps the drapery of his couch
> About him, and lies down to pleasant dreams."

On the evening of Monday, December 11, 1905, I was summoned to see him in consultation with his old friend and associate, Dr. Addinell Hewson, and found him suffering from a well-marked attack of angina pectoris, with which he had been seized at the close of his evening lecture. He was speedily relieved; in fact, thanks to the prompt treatment of Dr. Hewson, he was recovering from the attack when I arrived at the house. The next morning we saw him again and found him sitting up and apparently completely restored to his usual health. However, he was not deceived as to his condition, but was well aware that, as he expressed it, the "central organ of the circulation" was at fault. On the following Sunday (December 17, 1905) I was hastily summoned to his house and found him dead on my arrival. This is the brief story of his last illness. Like John Hunter, Hilton Fagge, and many others whom I might name, he died at his post, and if it is sweet and fitting ("dulce et decorum") to die for one's country on the field of battle, how much more so is it to die in the discharge of the duties of a profession whose object is not to destroy the lives of men, but to save them.

There is an epitaph of a medieval Spanish scholar[1] which sums up the life of a good man better than anything of the sort of which I have knowledge. It is, as a matter of course, in that language to which the scholar instinctively resorts when in search of the

[1] Alvaro Gomez de Castro, author of the celebrated biography of Cardinal Ximenez.

choicest morsels of condensed expression and may be translated: I have never wittingly injured anyone; I have endeavored to benefit as many as possible.

"Nemini sciens nocui
Prodesse quam pluribus curavi."

It might be appropriately inscribed upon the tomb of our late Fellow.

ANNUAL ADDRESS OF THE PRESIDENT.[1]

By ARTHUR V. MEIGS, M.D.

The history of the College each year is told in the reports of the Secretary and Treasurer, which are read at the December meeting. These are not printed, but are filed with the archives. The result is, that unless the Fellows attend the December meeting to hear them read, they have no opportunity to acquaint themselves with the affairs of the institution, unless they apply to the Secretary to be permitted to read the original reports, and that is for all practical purposes impossible. It would not be expedient for the President to repeat in his address in January, which is printed, what was already told in December. Last year I expressed the opinion that the reports of the Secretary and Treasurer should be printed each year in the Transactions of the College. It is evident that all of the Fellows did not deem it wise to follow my advice, for the Council, to which body the subject was referred for consideration, did not recommend any action. It is easy to see that there is some reason for the opinion that the reports should not be published, because they contain an account not only of the scientific proceedings of the College and of its dealings with questions of public affairs, but of its private business and financial status. This argument might be convincing if the College were still as small as it was twenty-five years ago, but it should be remembered that there are now more than four hundred members. It is my firm conviction that the preservation of the annals of an organization like the College is one of its important functions and that much of the record should be preserved in such a form as to render it easy of access for the members. This accessibility can

[1] Read January 2, 1907.

only be attained by printing the portion which it is important that the Fellows should be able to study and fully understand. If the majority of the Fellows believe that it would be inexpedient to print the history of our ordinary business and our accounts, the reports might easily be edited so as to eliminate any parts of our private business that it was thought undesirable to publish. I feel so sure that it is important that something should be done to put into the hands of every Fellow, yearly, in print, most of the information that is contained in the reports of the Secretary and Treasurer that I sincerely trust that steps may be taken soon to accomplish it, and I therefore venture again to urge upon you the importance of this matter.

It has been said that the organization of the College is unbusinesslike and that something should be done to consolidate the various departments as far, at least, as concerns receipts and payments. This subject has been considered by the Council more than once, and it has been found that it would not be easy to reorganize the College so as to employ a single officer to attend to the receipts and disbursements, and that such a change would entail quite a large additional annual outlay. When the institution grows sufficiently large to make such a rearrangement necessary, the change will be made; in the meantime the Fellows may rest assured that the business is so well managed that the loss from extravagance or waste is very small.

The subject of a new hall and of removing to another location is still before the College. The question has been frequently under consideration and has occupied much time at the meetings during the last five years; for it has been five years since this subject came into prominence. Last spring a resolution was passed directing the Building Committee, which had already been in existence for two years, to employ and pay an architect to prepare plans and specifications and to get bids to ascertain what it would cost to erect a hall upon the lot at Twenty-second and Ludlow Streets. The Committee was directed to report at the October meeting. To have made any finished report at that meeting was impossible, for the time had been insufficient. The work of this Committee is being carried on, and it may reasonably be expected

that a report will soon be laid before the College, containing the information the Committee was directed to obtain. A year previous to the passage of the resolution directing the Building Committee to proceed along the lines that have been described, it was resolved not to move to Twenty-second and Ludlow Streets, but that the lot be sold. Previously, during the five years that the subject of removal and of a new hall has been before the College, various resolutions have been passed indicating uncertainty of purpose, for at one time those having one opinion and at another those of a different view, have been able to command a majority at the meetings. The subject is a very difficult one, as it involves questions both of opinion and of finance. I will not occupy your time now by expressing my views, for the occasion is not, I think, a fitting one. In both of my previous annual addresses I alluded to the subject, and before I was elected President, and upon one occasion since my election, I fully expressed myself upon the floor of the College. It cannot, therefore, be said that I have failed to have an opinion in regard to a question which is one of vital importance to the College and to have expressed it so that everyone has had an opportunity to know it. On the other hand, I have thought it my duty, as long as I continued to be your President, not to enter actively upon the public discussion of a subject that involved much controversy. This has been because your presiding officer exercises a judicial function, both in deciding points of order and in directing the conduct of discussion at the meetings.

In the course of the past year the College has lost, by death, three of its members.

Dr. William S. Forbes was elected a Fellow in 1862, and he died December 18, 1905.

Dr. William G. Porter was elected a Fellow in 1872, and he died January 30, 1906.

Dr. William M. Angney was elected a Fellow in 1896, and he died November 19, 1906.

The Censors have directed that memoirs be written of two of these deceased members. The third, Dr. Angney, was a younger man and had been a Fellow a much shorter time. He had occupied various positions connecting him with public institutions and was.

for a time, one of the physicians to the Department of Public Health of the City. He was, for a number of years, surgeon to the Police Department of the City, and proved a very acceptable officer. This office he still occupied at the time of his death. Dr. Angney was a much respected practitioner of medicine.

The College has done me the honor to elect me its President for three years and this is the full term for which, according to the By-laws, anyone can continuously hold the position. It may perhaps not be thought unduly egotistical for me now to mention the various steps that have marked my career of service, for the recital will show what the College has done for one without any claim upon it but love for it, coupled with the wish for its prosperity, and willingness to work in any position and at any time, when given the opportunity.

I was elected a Fellow in 1875, and in 1884 I held office for the first time by becoming the junior member of the Publication Committee. In 1885 I was elected a member of the Council and in February, 1889, I became Chairman of the Publication Committee, which position made me again a member of the Council. I was elected a Censor in April, 1895, and resigned from the Publication Committee. In 1902 I was elected Vice-President, and in 1901, I was chosen President. It was nine years, therefore, after I became a member of the College before I held any office. Since 1884, during a period of twenty-three years, I have been continuously in service.

In retiring from office it is fitting that I should thank you for the great honor you have done me in electing me to the highest office in your gift, and, further, for the courtesy and consideration you have shown me upon all occasions; and during the last three years we have together passed through various trying vicissitudes. Without your patient consideration and confidence it would have been impossible for our meetings to have been conducted with such decorum as has uniformly prevailed, or for our affairs to be in the good order in which they now are. For your consideration I return you my heartfelt thanks, and believe me that my feeling of gratitude is much more heartfelt than my command of language enables me to express.

THE TREATMENT OF CHRONIC DISEASES OF THE HEART.[1]

By PROFESSOR THEODOR S. SCHOTT, M.D.,
NAUHEIM, GERMANY.

Allow me, first of all, to thank the President and Fellows of the College of Physicians most heartily for your very kind invitation, which affords me the opportunity to lay before you a few particulars of the treatment of heart diseases and some of my experiences in this connection.

Hardly twenty-five years have elapsed—and many of you will remember that time—since there were known, apart from hygienic directions, only two means of dealing with chronic cardiac disease, viz., rest and digitalis.

The general opinion, and the one generally held in our universities at that time, was, that when these two means failed heart diseases were the *noli me tangere* of medical therapy. Even the view of Stokes, that in certain cases of fatty heart stronger exercise and climbing might prove very useful, was soon forgotten. This was partly due to the fact that, especially in the matter of chronic heart complaints, particular attention was devoted to pathological anatomy and to physical diagnosis, whereas therapy itself was more or less neglected.

No longer than twenty-five years ago three methods of treating cardiac diseases appeared nearly simultaneously, and, as I shall point out, quite independently of each other; they are known today as physical therapeutics. They were: (1) Oertel's mountain-climbing cure. (2) The so-called Swedish method, the leading

[1] Read February 6, 1907.

feature of which was Zander's treatment by the use of mechanical apparatus, and (3) the balneogymnastic treatment described by my late brother, August Schott, and myself. You are all well acquainted with these different methods, and I may, therefore, enter at once into the consideration of the single points which are perhaps of special interest to you.

For the sake of completeness I must not fail to mention that the number of remedial agents used in the treatment of chronic cardiac diseases has largely increased. I find it impossible, to my regret, to dwell on this subject at greater length, but intend to treat it more extensively later on.

Digitalis, either with or without digitalin and digitoxin, is and always will remain our most important remedy. But sometimes its cumulative and toxic effects compel us to look for other agents, the most important of these being tincture of strophanthus, which acts more slowly and safely.

Special reference may be made to strychnine, which is used per orem and also subcutaneously. Strychnine may, of course, be used when the heart muscle is weak and relaxed. Its use is often desirable, but in recent years there has been perhaps too strong a tendency to resort to it as a heart tonic. It produces stronger contractions of the walls of the heart, but unless carfully watched, or when used for too long a period, it sometimes sets up a condition of abnormal irritation, occasionally followed by a recurrent weakness of the cardiac muscle.

Many other heart tonics, called vasodepressors, have likewise been adopted, especially the nitrites. Their chief representatives are erythrol-tetranitrite and nitroglycerin, the latter being more successfully employed in liquid form, generally a 1 per cent. alcoholic solution. The action of this is highly effective in certain cases of pain and oppression.

In angina pectoris the haloid salts, especially those of iodine, often produce effects similar to those of the nitrites. But they are not counted among the vasodepressors, and it is still an open question whether a changed viscosity or other circumstances exercise an influence in this respect.

Salts of mercury, and above all calomel, are not remedies for the heart in the strict sense. They influence much more the action of the kidneys, and when combined with digitalis they are, separately or collectively, excellent diuretics.

The slowing of the pulse caused by morphine is the result of weakening of the ventricular contractions; thus it fails to tone up the heart. This view is amply supported by clinical observations. Nevertheless, this remedy is not to be discarded entirely in cases of intense pain, oppression, or condition of great cardiac anxiety. A strong dose may then be administered, though not too frequently or for too long a period.

The inherent defects of remedies and the oft-recurring want of success obliged us to look for other means, and led at last to the methods which, as I have said, are known as the physical treatment of chronic heart diseases.

Let us begin with the method which, though the most recent, aroused general interest for a short time, viz., that of Oertel.

I. OERTEL'S METHOD.

The Dublin physician, Stokes, had already observed that an enervating *regime* is injurious to persons suffering from cardiac disturbance, and more especially in cases of fatty heart. He expressed himself in favor of bodily exercise, chiefly mountain-climbing, and described how patients that were breathless as soon as they had begun to climb returned with an improved action of the heart. His teaching was soon forgotten until, some twenty years ago, it was taken up by Oertel, who modified his method, combined it with a limitation of the supply of liquids, and applied it to the sphere of all disturbances of circulation.

Oertel had three objects in view, viz.: (*a*) To facilitate the circulation by reducing the amount of liquid in the blood; (*b*) to strengthen the heart by walking and climbing; and (*c*) to remove the superfluous deposits of fat by a strict diet.

Numerous experiments and observations have proved the unsoundness of Oertel's original assumption that every quantity

of liquid absorbed increased the amount of water in the blood. On the contrary, we have discovered that the composition of the blood is much more constant, and above all that a reduction in the quantity of the blood does not tend to strengthen the circulation in the lungs. Oertel's diet may be employed successfully in dealing with fatty hearts, and especially with persons whose blood is of normal quality. His dietetic scheme possesses the great advantage over those of Harvey-Banting, Schroth, Ebstein, and others, of coming nearer to the components which Voit and those of his school have laid down as best adapted to the nourishment of the human body. However, the point must be insisted upon that most sufferers from cardiac complaints do not want to lose fat, but to increase muscle, and that a too great and too rapid loss of weight should be avoided. Losing from forty to fifty pounds in from four to six weeks, as mentioned by Oertel, may be allowed now and again without injury, but experience shows that small losses of weight produced by inadequate nourishment combined with a diminution of liquids may cause serious harm within a short time

The mechanical part of the Oertel treatment consists in the exercise of walking and climbing. For the latter the author selected mountainous localities of moderate altitude, which he named "Terrainkurorte," in which different degrees of climbing were prescribed. In this manner he hoped to obtain a development of strength of the heart by means of increased muscular action. In recent years Oertel combined the climb-cure with pneumotherapy, application of dry heat, electricity, and massage. His method of treatment was originally devised for fatty heart. In order to generalize it for the treatment of all chronic cardiac disease he propounded a number of theories which were for the most part erroneous. It was above all the want of success attending these therapeutic measures, and the dangers to which they so obviously gave rise, that led many to abandon them. Instead of a low diet we often require a very strong and generous one. Furthermore, climbing entails so much exertion on the organism that such a course should follow and not precede other cures;

moreover, climbing should only be resorted to when by other means the heart muscle has become sufficiently strengthened to allow it to perform such an increase of labor without danger.

In accordance with these observations Oertel's treatment may be adopted only in a very limited number of cases. Undoubtedly his greatest and most undisputed merit is, that he has given a remarkable impulse to the mechanical treatment of chronic heart disease.

II. THE SWEDISH METHOD.

Gymnastics and massage were first carried on practically on a large scale in Sweden. Having no scientific basis, and not being improved upon, the Swedish method never went beyond Sweden until Wide and others took it in hand.

The system began to find general acceptance only through its most clever exponent, Zander, who, besides manual therapy, invented very ingenious apparatus, expecting to render the patient independent of the position of the body and of the assistant. Opinions, however, are much divided on these points. Nevertheless, it is beyond doubt that Zander's method constituted a most important improvement. It is an excellent means for strengthening the muscles of the heart and accelerating the circulation of the blood. Many points applicable to gymnastics in general hold good in regard to Zander's system.

But a continual supervision is needful here, in order to regulate the resistance of the apparatus and the conduct of the patients during and after the exercises, otherwise failure will result. These failures occur very easily, because exact individualizing in the determination of the resistance of Zander's mechanical contrivances is very difficult to obtain.

The great expense of the various apparatus, the dangers of overuse, together with the restricted conditions under which patients can have recourse to them, must be an obstacle to their general adoption. In recent times Herz has improved the Zander machines by the introduction of an eccentric wheel and a weight moving on a smooth inclined plane. There can be no doubt

but that the apparatus in question is to be preferred to others whose action is more limited, such as Gaertner's ergostat, the so-called hygienist rowing apparatus, tricycle, and many other modern apparatus.

III. THE BALNEOGYMNASTIC TREATMENT.

As far back as 1872 Beneke, in opposition to former views, showed that patients subject to acute rheumatic fever could successfully use mineral baths when the polyarthritis rheumatica acuta was complicated with cardiac complaints. Even when a freshly developed valvular lesion exists it may be cured within a short time by absorption of the exudations on the valves through the use of the baths. My late brother and I found that a carefully executed balneologic cure, combined with gymnastics which culminate in mountain-climbing, frequently and even regularly produce an improvement which is soon noticeable, and even, according to the nature and condition of the complaint, an ultimate and absolute cure. I wish to point out to you how we explained the mode of action of our treatment. We conclusively proved that the same principles obtain as regards baths as well as gymnastics, viz., to promote the action of the heart with the view of stimulating its activity, *i. e.*, of toning up a weak heart. In the majority of cases we have to deal with a comparative or absolute inadequacy of the heart muscle to impel the circulation of a normal quantity of blood. This inadequacy involves an insufficient expulsion of blood from the cardiac cavities and hence leads to dilatation. But not every dilatation, as was first proved by A. Schott, leads to the danger of a want of compensation. We must differentiate between a dilatation produced by congestion and a compensatory one. The latter serves to overcome the obstacles caused by valvular lesions. Only the first form of dilatation requires treatment. The action of the heart muscle must be stimulated in such a manner that by stronger systolic contractions it may rid itself of the superfluous amount of blood. The dilatation—whether due to insufficient ability to contract or to a

valvular lesion—means congestion of blood within the heart itself. The heart goes through many but insufficient contractions, and after each systole a certain quantity of blood remains within the heart cavities. The pressure within the aorta cannot be overcome merely by the force of the heart itself. My brother and myself were at last enabled to describe how, by means of our balneologic as well as our gymnastic treatment, the heart becomes stimulated to a more forcible and vigorous systole.

The pressure within the aorta and within the entire arterial system, as established by experiments on animals, often increases to a considerable extent, but on account of the hyperkinesis and hypertrophy of the heart, it is in better condition to overcome this increase of pressure within the arterial system. The heart is now able to empty its cavities completely during the systole, and concomitant with this, the suction-effect of the diastole is more effective. In this way the heart is relieved from the constant overpressure which previously, during the permanent overfilling, acted upon the inner surface of the cardiac cavities, inciting the muscle to rapid and enfeebled beats. The increasing intra-arterial pressure endows the heart with new inhibitory impulses, and on this account it is enabled to beat more slowly and also more vigorously. This last fact is easily noticeable and has not only been frequently demonstrated by us, but has also been confirmed by many others.

Various authors have attempted to explain the effect of the baths on the heart as a diversion of the blood from the internal organs to the skin and muscles. In this manner a saving and an easement of the heart's action may be produced. But to my view this theory does not sufficiently explain the vigorous and immediate effect of the baths and gymnastics. The action of the bath is generally weaker but more enduring, whilst that of the gymnastics is more energetic but less lasting, especially at the beginning of the treatment. We observe a diminution of congestion within the pulmonary circulation as well as in the general venous system; in consequence of this a quieter respiration as well as a decrease of hepatic congestion, and a reduction of the cyanosis is brought

about. Immediate observation usually shows a decrease in the frequency of the pulse of from ten to twenty beats per minute. In consequence of the increased quantity of blood thrown into the arterial system the sphygmographic tracing shows higher primary elevation. The slower pulsation causes the systolic and especially the diastolic tracing to be prolonged. The latter circumstance is the expression of a longer period of restoration of the weakened heart muscle.

In suitable cases we notice that an already existing arrhythmia disappears. The first diagram is of the pulse of a man, aged fifty-two years, who suffered from mitral insufficiency, with long-existing myocarditis, complicated with emphysema. Within the first week of his stay at Nauheim, and almost immediately after his arrival, he experienced two violent attacks of embolism of the lungs. Besides that he was suffering from congestion of the liver, edema of the legs, etc.

The second diagram of the pulse, taken just after a bath, shows not only a decrease in the frequency of the pulse from 104 to 96, but also the disappearance of the arrhythmia. The blood pressure, measured by Gaertner's tonometer, rose from 82 to 90 mm. Hg.

A third diagram of the pulse shows the character of the pulsations at nearly the end of the treatment after an effervescent (sprudel) bath of spring No. 14. The frequency has been lowered to 78, while the tonometric pressure has risen to 105 mm. Hg.

The effects of the balneologic and gymnastic treatment may both be ascertained in the same way by percussion. The narrowing of the limits of the heart obtained by the baths is often not so marked, though more lasting, whereas the gymnastic exercises reduce the size of the heart more quickly and considerably at the beginning of the cure, although this effect is less permanent, as I have mentioned before.

I take pleasure in demonstrating to you these changes in the heart limits with a few drawings, which have been executed partly by professors and other medical men who have visited me in Nauheim, and partly by myself.

The radiograms, including orthodiagrams, are of valuable assistance in examining the size of the heart. But the difficulty of having the patient invariably assume the same position at different sittings, and the fact that the skiagrams do not give well-defined outlines of the heart, are both liable to give rise to errors, and besides do not render other methods of examination superfluous. By means of auscultation we often realize the change in the cardiac sounds during treatment. The weak sounds of the heart often become more audible, while some which were not audible may become so. A murmur produced by a relative insufficiency changes into a divided sound, and ultimately into a normal one. But in other cases, for instance in valvular disease, a murmur which was not audible becomes so by a stronger contraction of the cardiac walls.

Palpation and inspection also demonstrate that the apex beat moves upward and inward; this with the simultaneous rise in position of the diaphragm constitutes a further proof that the size of the heart has been reduced. The ability to walk and the general condition are improved. The diuresis becomes more copious, chiefly by balneologic treatment. As you may observe, a tonifying effect is obtained similar to that following the administration of digitalis, but with the difference that injuries may easily be avoided. In addition to this the whole organism, and especially the cardiac muscle, gains strength. This strengthening of the heart is produced by the disappearance of congestion in the venous system, and by an increased volume of blood within the arteries. Owing to these facts the blood which flows into the coronary arteries is more highly oxygenated, the heart is better nourished, and more and better muscular substance is developed.

In a large number of cases I have instituted exact investigations concerning the changes which the blood undergoes during a course of balneogymnastic treatment. In a dissertation, in which I communicated the results of these investigations, I demonstrated that in such cases where the amount of hemoglobin had been diminished, it again became considerably increased by the treatment in question. And now I should like to give you a short description of our balneologic and gymnastic systems. You will

find something about them in many medical publications. Some of these have also been issued in America, such as those of William Osler, Babcock, Tyson, Anders, Solis Cohen, John K. Mitchell, Kinnicutt, Camak, Manson, and others.

(*a*) *The Balneologic Method.*

Let me begin by stating that it is just as impossible to give more than general rules in the matter of balneologic treatment, as it is in the field of internal medicine. I need scarcely say that strong individualizing in treatment is absolutely necessary. Balneologic treatment is an agent of great power as regards its influence on the heart; and unless it be applied with due caution and under *uninterrupted medical supervision*, combined with frequent observation of that organ, the clinical picture may undergo a sudden and serious change. Without this careful supervision and observation, results the reverse of favorable may ensue. *Pari passu* with the treatment, cooler temperatures are better borne, and may be applied with good results. Opinions supporting this view can be found in the publications of several Nauheim medical men.

It is very often advisable to observe the patient before, during, and after the bath. In severe cases it is best to begin with a simple brine bath. As the Nauheim baths contain from 2 to 3 per cent. of sodium chloride, and the same proportion of calcium chloride per thousand they should occasionally be diluted. The duration of the first baths should not exceed ten minutes, with a temperature of 93° F., which should not be lowered much during the first week. When we have to deal with anemic patients or such as easily become chilled, prudence must be exercised in the use of low temperatures. The temperature of 95° F. must not be exceeded, even when a combination of rheumatism and heart disease presents itself, otherwise the tonifying effect on the heart might fail to appear. In such cases cooler but shorter baths should be preferred.

If the patient remains quiet, he may, during the first minute, experience a sensation of chilliness. After that time a feeling of

comfort should come over him, partly because of the heating effects of the bath, and partly because he is becoming used to it. But, should this feeling of comfort not be attained within one minute, and the chilliness not disappear, the bath must slowly and carefully be raised to a sufficient temperature. As a rule the patient should have the sensation of warmth as long as he remains in the bath. There are cases where patients, in spite of keeping quiet in the bath, feel chilly again in a little while. This second chilliness should also be avoided, for it shows that such a bath was too prolonged for its relatively low temperature. Either the temperature should be raised at once, or the patient must leave the bath immediately. On the following days the bath should be taken warmer, and the time of immersion shortened.

If the patient bears the treatment well, more concentrated baths may be given. First of all, the concentration of salts should be increased, especially the quantity of CaCl. We often concentrate the brine bath by the addition of mother-lye, condensed from our springs. Later on the baths containing CO_2 may be employed.

The next step upward is furnished us by the so-called "thermal baths," with their weak percentage of natural CO_2. For this purpose, large, open basins are provided into which the water is conducted. Part of the CO_2 escapes into the air, so that the water of three of our different springs reaches the bath with an amount of about 400 to 500 c.c. of free CO_2 per liter.

Besides these reservoirs large underground basins have been constructed, which make it possible to keep up the natural heat of the water and to reduce to a minimum the evaporation of the CO_2 in the open air. These reservoirs provide us with water which we term "thermalsprudel." This water enters the bath with an amount of 1000 c.c. of free CO_2 per liter, and constitutes a transition stage from the thermal to the effervescent baths.

The water for our effervescent or so-called "sprudel baths" is led directly from the main pipe into the bath-tub. In addition to its strong mineral ingredients it contains between 1200 to 1500 c.c. of free CO_2 per liter.

Finally, the strongest of the Nauheim baths is the effervescent running bath, known as the "stromsprudel bath." The water flows in and out of the tub, with an excess of pressure of from one-half to one and a half atmospheres, while the patient remains in the bath. The mechanical effect thus produced is still further enhanced by the largest proportional amount of CO_2, with natural temperatures of 86° to 93° F., with which we are acquainted; that is, 2000 c.c. or more of free CO_2 per liter. These qualities render the Nauheim baths the most efficient we know of.

The majority of patients require an intermission or pause, in some cases after the first, but generally after the second day. At a later stage three or four baths in succession may be given, and at the same time the duration of the baths may be prolonged, but this should rarely exceed twenty minutes. After each bath the patient should be rubbed vigorously by the attendant so as to put him into a glow. After that he should remain in bed at least one hour, in order to rest and maintain an equably warm temperature. The physician's endeavor should be to lead to a constant and careful increase in the efficiency of the bath. The baths should be given progressively cooler, longer, and more frequently. A strict supervision of the condition of the heart should be kept up uninterruptedly; the success of today's bath should give the measure for tomorrow's.

The efficacy of the Nauheim baths may be explained by the following data:

1. The possibility of the fullest graduation of the baths, which allows of beginning with a weak brine bath and then concentrating the mineral ingredients by means of the mother-lye, which acts strongly on the peripheral nerves, as it contains about 40 per cent. CaCl.

2. The employment of waters of appropriate natural temperatures, viz., 86° to 93° F., such as are used in routine daily life.

3. The possibility of beginning with a small amount of CO_2, which may be gradually increased to the greatest quantity we know of for these bathing temperatures. The water of the effervescent bath being in contact with the integument loses part of its CO_2

on account of the body heat. We know by experiments that the mineral ingredients of the water act by imbibition, whereas the CO_2, with its movable molecules, penetrates rapidly through the skin, and hence produces a quickly tonifying effect.

4. The mechanical effect of the sprudelstrom bath is added to this. In this the water, containing fresh quantities of carbonic acid gas in the nascent state, constantly pours into the tub and bombards the body surface.

5. The radio-activity of the Nauheim springs was established two years ago by Professors Elster and Geitel, and the results were published in the *Physikalische Zeitschrift*.

The summer months are most suitable for the bathing treatment. In milder cases from four to six weeks are sufficient, after which an "aftercure" is advisable. This should be taken at a moderate mountain altitude, that is, not over 1000 meters. On the other hand, in severe cases, the cure requires several months. In such cases it is advisable to divide the cure into two parts, between which periods the abode in the mountains should take place. In winter patients should resort to a warm, southern climate, in order to remain a long time in the open air.

The Nauheim baths may, with certain limitations, be made artificially. My brother and I have published exact directions on the subject. For this purpose either the Nauheim bath-salts may be used or else their most important ingredients must be employed, *i. e.*, NaCl and CaCl in due proportions. The development of carbonic acid gas is best produced by bicarbonate of sodium and commercial hydrochloric acid. The chemical equivalents of both give the proportions in which they should be added to the bath. Should a solution of hydrochloric acid contain 42.5 per cent. the proportion of bicarbonate of sodium should be the same. But when, as is generally the case, the hydrochloric acid is more diluted, the quantity of the solution must be increased in proportion to its concentration. The quantity of bicarbonate of sodium should at first be 100 grams per bath, gradually being increased to from 1000 to 1500 grams, the bicarbonate of sodium being dissolved simultaneously with the other salts. The hydro-

chloric acid should be poured on the water close to its surface and evenly diffused, or else the bottle containing it should be placed in the bath, some time before the patient enters it, in order to allow a slow diffusion of the hydrochloric acid. In this way the CO_2 may be developed for one-half hour or longer.

Through our directions the artificial Nauheim baths have come into very extended use. I wish to lay particular stress on the fact that many mistakes and misconceptions arise regarding the application of these baths. We often read in accounts of their effects that it is only the CO_2 which acts upon the heart. This, however, is quite erroneous. A good result, as already mentioned, can only be obtained by a gradual increase of all the component parts. Employing ingredients in fixed doses as manufactured and sold leads to mischief, because the quantity of CO_2 cannot be regularly graduated, the difference in the amount of CO_2 being too great and too sudden with each increase.

Thus I have often observed that unsatisfactory results were obtained with many patients, owing to the insufficient gradation, which rendered it impossible to regulate the baths either according to the nature of the complaint or to the temporary condition of the patient. It is evident that constant medical supervision, based on long experience, is absolutely necessary in the administration of artificial baths. In most instances a good result is only obtained when the patient is relieved from family and business worries, and, if possible, given better air and a change of surroundings. A suitable diet is likewise of great importance. In certain cases, and when proper means are adopted, excellent results may be derived from the artificial Nauheim baths. The number of successful cases must necessarily be limited, because the strongest forms of the natural baths—effervescent (sprudel) and effervescent running baths (stromsprudel)—cannot be made artificially.

(*b*) *Method of Gymnastic Treatment.*

As already pointed out, similar results may be obtained with graduated gymnastic exercises as with bathing. The baths act through the sensory nerves, while the gymnastics act through the motor nerves. We make use of:

1. Exercises with resistance, in which the assistant resists the muscular action of the patient.

2. Gymnastics with self-resistance, in which the patient himself brings antagonistic muscles into action.

The following principles may be recommended for the application of gymnastics. Each exercise must be performed *slowly*, and the resistance must be regulated so that the patient will always *breathe freely and without interruption*. This aim is best attained and fatigue of single muscles avoided when new groups of muscles are alternately brought into action, and a pause made after each movement. When all the muscles of the trunk, arms, and lower extremities have been exercised in this manner and the condition of the patient admits of it, the exercises may be repeated in several series. The different kinds of motion, consisting of flexion, extension, abduction, adduction, and rotation, are of course determined by the nature of the articulation of the joints. They have been so often described that no further description of them is required. I wish to add, however, that a great variety of exercises are performed.

It is not very difficult to teach anyone how to become a gymnastic operator, provided that he is conscientious and possessed of a certain degree of intelligence and power of observation. A certain amount of knowledge of anatomy and physiology is presupposed; should it not be present it may of course be gradually acquired. In many cases it is advantageous to train a member of the family so that the patient may always avail himself of his services. Further rules for the operator are, that he must not grasp or in any way constrict a portion of the patient's body, so as not to impede the movements, but to resist them. When an exercise is carried on too quickly, or with too great resistance, he should not begin a new one before the patient breathes quietly and the pulse again becomes slower.

By adopting these exercises a bedridden patient may be relieved and strengthened to such an extent that he may be able to get about. I have received, on this point, most favorable reports, also from medical men in the United States.

Even many years ago I had the opportunity to observe that in some cases in which digitalis had been extensively administered it ultimately proved ineffective, whereas, when used in combination with baths and gymnastic exercises it again produced its effect.

It is advisable to resort, first, to the resistance exercises; later on the patient learns the exercises with self-resistance, which possess the great advantage of allowing him to make use of them at his own convenience, and independently of anyone else. After the resistance exercises are finished, as already mentioned, the course of treatment should be concluded with mountain-climbing, but only then, when the heart muscles have really become strong enough to bear the increased strain without any risk.

The powerful effect produced upon the heart by the baths and the gymnastic exercises indicates under what circumstances this treatment is inapplicable—in fact, when it is contra-indicated.

These contra-indications are:

1. Aneurysm of the heart and of the large vessels.

2. Cases of advanced arteriosclerosis with such extensive degeneration of the cardiac muscle that every increase of muscular action becomes dangerous, either by producing rupture of the aneurysmal sac, or by causing apoplexy or embolism.

It has recently been attempted to include in the treatment by mineral baths cases of advanced arteriosclerosis, and well-developed myocarditis, for the reason that at a suitable temperature these baths cause the blood to be diverted from the internal organs to the periphery. In such special cases this factor should not be considered decisive, because the ingredients of the baths, with or without the CO_2, have a far stronger effect upon the heart, and may, therefore, lead to the above-mentioned dangers. Contrary to what has recently been maintained by some French and also by some German physicians we cannot admit that the absolute height of the blood pressure is a reliable indication for deciding whether a bathing or gymnastic cure should be resorted to.

Thus we can see that in cases of renal congestion or excessive dyspnea the unusually high blood pressure decreases under our treatment, while, on the other hand, a blood pressure which has

become too much lowered, owing to debility of the heart, increases under this same treatment. My brother and I resorted to massage, especially under the form of *tapotement*, particularly in cases of cardiac excitation, and by this means we often found it possible to restore tranquillity within a short time. But this result is not lasting, which may also be said of vibratory massage.

The application of cold, especially in the form of ice-compresses or ice-bags, is also a good means for quieting the heart's action. In cases where the heart requires quick stimulation, the use of high temperatures may be resorted to with great advantage. For this purpose an india-rubber bag containing water of from 140° to 150° F. may be applied by shifting it gradually over the entire region of the heart and chest.

Until recently electricity was mainly used in order to quiet the heart's action. During the last few years electricity has been applied in the form of sinusoidal currents. It has been claimed that in this way the heart could be quickly and permanently reduced in size, but this view has not been generally accepted.

A separate paper would be required to give an adequate description of the diet required by patients with heart disease. I only wish to point out the following as a general rule: A mixed diet is to be preferred; the nourishment must be easily digested and not spicy. Exciting or effervescent beverages, or such as tend to produce gastric distention, should be excluded. The consumption of any large quantity of liquids or solids at any single time should also be avoided, for a distended stomach compresses the lungs and displaces the heart by pushing it upward and outward. In addition to this the heart has to struggle against an increased intra-abdominal pressure, which should be avoided. When this pressure already exists, and is caused by constipation or flatulency, it may be made to disappear by combining a drinking cure of saline waters with the bath cure.

The use of tobacco may easily prove injurious, and should either be restricted or entirely prevented, when this is possible.

Owing to want of time, and much as I should like to, I must refrain from dwelling upon certain accessory points, such as

dress, occupation, the advisability of contracting marriage, etc. The skepticism which a few decades ago prevailed in the medical world has vanished in a great measure, and a very material change has become apparent, especially as far as therapy is concerned. I should be greatly pleased if I have succeeded in showing you that satisfactory progress has really been made in the matter of therapy in chronic complaints of the heart.

I desire to thank you all for the kind attention you have shown me during this lecture, and I hope that the subject I have laid before you may not have been entirely devoid of interest.

DISCUSSION.

Dr. S. Solis Cohen: I am sure that I voice the sentiments of all the Fellows of the College in saying that we are very much indebted to Dr. Schott for his lucid presentation of the subject and the very graphic demonstration made by the sphygmograms and tracings which he has permitted us to see. There is one of the sphygmograms which makes me ask Dr. Schott whether after all it is not possible that dilatation of the peripheral vessels plays an important part in the good effect of what he must allow us to call the "Schott *Kur*." I know that Dr. Schott does not accept the theory, advanced by British physicians, that the greater part of the value of the effervescent bath and the gentle resistance exercises depends upon peripheral vascular dilatation. I will go so far with him as to affirm that the heart itself is stimulated, reflexly by the baths, and both sequentially and reflexly by the exercises.

In one of the sets of sphygmograms, however, there is such a striking contrast between the tracings before and after the treatment in a case of aortic stenosis that it is impossible for me to conceive that a mere increase in the force of the ventricle which had so narrowed an outlet would change (illustrating) that kind of a tracing into one like this (illustrating). Yet just this contrast is shown. It seems to me proof that there must be an increase in the caliber of the peripheral vessels in order to permit the blood to flow so freely through the contracted orifice. The central blood pressure is indeed raised, but the peripheral resistance is diminished, and the two effects together give a larger upstroke but a less sustained level; in other words, a normal variation of systolic and diastolic central and peripheral pressure. That at least is the theory guiding me along the path whereon I have followed in Dr. Schott's footsteps in applying the methods with which he and his brother have enriched our therapeutics.

I was very glad to hear Dr. Schott say that his method was one of strict individualization. The so-called "Nauheim treatment" has done a great deal of harm in America, I am sorry to say, because it has been taken up by physicians who have tried to apply physical measures, as they sometimes try to apply drugs, without taking into consideration all the conditions of the individual case and without themselves carefully watching the effect of the first baths and the first exercises. I am sure that I have seen patients whose condition has been rendered worse by the ignorant application of this excellent method. It is not one that can be entrusted to the administration of a masseur or of a "professor" of Swedish gymnastics. The great fault that I have noticed in trying to train persons to administer the Schott system of exercises is that many cannot be made to understand the meaning of the word "gentle" by which we have tried to characterize the method in English—translating "widerstand gymnastik" as *gentle* resistance exercises. The operator has to be cautioned and trained not to put the full strength of his muscles against the effort of the patient; and not to resist at all when the limb comes into such a position that the patient's own antagonizing muscles offer sufficient resistance. Dr. Schott understands and has therefore treated us very gently. I suppose, because he is our guest as well as teacher, but we, being hosts and pupils, have a right to criticise ourselves.

Another point in which our operators fail very much is in the constriction which they make upon the limb, although they are told distinctly not to do so; and still another point is the speed with which they endeavor to go through the performance. It is not a difficult matter to learn and yet its details are all important. Dr. Mitchell and I have succeeded in training a few men and women, but there is no way to restrict practice of the competent. Perhaps in this day of multiplied examining boards it might not be out of place to have a State examining board to determine an operator's fitness before he is turned loose to tamper with the hearts of patients. The examination, however, would have to be a practical one, not the irrelevant sort of historical and literary inquisition in which so many "State Boards" delight.

I was glad also to hear Dr. Schott say that the question of diet must be considered. I am sure I have seen failures in this treatment because that question was ignored. As in the case of the baths and the exercises it is a matter of strict individualization. We can no more lay down hard-and-fast rules in this than in any other part of the therapeutic art, because with all our scientific advances in the laboratory, practical therapeutics is still an art. It is to be applied in the light of science by a man of progressive and exact knowledge, but to be applied with the artist's judgment for the needs of the individual patient at the particular time.

Dr. James M. Anders: I am sure that we all feel like congratulating Dr. Schott upon his excellent paper; it was at once both thoroughly scientific,

and practical. In the treatment of chronic cardiac diseases too much attention has doubtless been paid in the past to drugs, and I was very glad to note that Professor Schott did not spend much time on this aspect of his subject. I was glad to hear him speak favorably of strophanthus as a heart tonic. I have had good results from its use in cardiac disease with associated arrhythmia either when given alone or with digitalis.

I have no wish to criticise Professor Schott, but possibly a little more stress might have been laid upon the treatment of the causes of chronic cardiac diseases, for, after all, the most successful treatment of these complaints, as well as of other affections, is the successful treatment of their causes. With Professor Schott I believe that more is gained for this class of sufferers from physical and physiological means than from the use of drugs alone. I was permitted to observe the results of the Schott method of treatment in a great variety of cases and was much impressed with its efficacy. As pointed out by him the most marked effect was in the lessening of the size of the heart. I was able more than once, particularly after the resistance exercises had been properly applied by a trained operator, to find that the transverse diameter of the heart was decreased by half an inch and even more. The cases of chronic valvular disease with lost compensation of moderate grade were almost immediately benefited to a remarkable extent. The principal factors in bringing about this increased vigor in the heart are, as stated by Prof. Schott, the indirect influence of the saline baths acting upon the cutaneous sensory nerves, and the stimulation of the peripheral motor nerves by the resistance exercises. It should be remembered that the most marked effect is noted after the resistance exercises have been employed, at least so far as the size of the heart is concerned. Not only so, but it seems to me that the metabolism of those patients was distinctly and favorably influenced, and this effect could scarcely be accounted for by the improvement in the circulation alone. It is to be borne in mind, however, that one of the obvious effects of the treatment is to overcome spastic contraction of the arterial system and by so doing increase the lumen of the vessels, thus bringing more nutrient material to the myocardium and to all portions of the body as well. This salutary influence tends to promote the warmth of the body and to stimulate and regulate the metabolic processes.

I was convinced of the fact that the resistance exercises form an important part of the Schott method of treatment in the great majority of cases. Especially was this so in cases of cardiac dilatation. I agree with Dr. Cohen that in this country those who attempt to apply these exercises are not sufficiently gentle. The success of the treatment must depend largely upon the skill and accuracy with which it is carried out in the individual case. One must have complete mastery not only over the different elements that enter into the treatment, but also an equally complete mastery over every detail of the patient's

life. One of the things which struck me most forcibly in my observation of Dr. Schott's cases was the child-like obedience he was able to elicit from his patients. Personally, I do not believe the treatment can be carried out as effectually at home as abroad. A favorable environment, such as can be obtained at Nauheim, is very essential to the successful application of the treatment. It is for this reason especially that in this country we are greatly in need of well-equipped and properly officered institutions away from the densely populated centres, where this method could be carried out scientifically. We all know how the cares, worries and responsibilities of patients weigh upon them at home. I am sure that Professor Schott's visit to this country has been the means of placing the profession under many obligations to him, also that it will serve to stimulate a greater interest in the study and treatment of chronic cardiac disease.

Dr. S. Solis Cohen: I do not wish to be misunderstood as saying that it is impossible to get anyone to carry out the Schott exercises properly. On the contrary, there are three or four excellent operators in Philadelphia who Dr. Mitchell and I have trained; but there are also some ignorant persons who attempt it very light-heartedly—they may be good enough massage operators, but they do not understand gentle resistance movements—and these and their sort are the ones who do the harm.

Dr. Judson Daland: In certain of these cases of chronic cardiac disease with failing compensation it becomes a matter of considerable importance to determine whether or not these resistance movements are applicable and also whether it is desirable to institute them in certain cases. An expedient that has served me with much satisfaction is to request the patient to make a certain number of muscular movements by bending the body forward until the fingers touch the ground. It is interesting to note that in these particular cases at times, especially when exercise is contra-indicated, the first sound becomes distinctly weaker after a few of these movements and perhaps no other sign may be present. In cases where exercise is indicated the heart becomes somewhat stronger and a repetition of these same movements will be followed by a manifest increase in the muscular element of the first sound of the heart. In such a case a small amount of exercise should be given and slowly and gradually increased until satisfactory results are obtained. This method of estimating the condition of the cardiac muscle in its reaction is so easily applied that I venture to bring it to the attention of the meeting.

Dr. Schott (closes): In connection with the remarks of my friend and colleague, Dr. Solis Cohen, I take the liberty to draw your attention to the fact that the most frequent symptom observed, as well after the baths as after the gymnastics, is a change in the volume of the pulse, *i. e.*, the pulse becomes fuller and generally softer. Differences in the frequency of the pulse are most noticeable where an abnormally increased frequency already exists. In

such cases the amelioration of the volume is generally concomitant with the diminution in the frequency; and, as already mentioned, any existing arrhythmia usually disappears promptly.

As regards the changes in the heart limits, which I had the pleasure of demonstrating this evening, they all concerned cases where the cardiac dilatation was a very considerable one. I had especially selected such patients in order that visiting colleagues might easily recognize the effect of the baths as well as of the exercises, and also of the combined balneogymnastic treatment. Professors Tyson and Anders, of this city, have given detailed accounts in regard to such diminution in the size of the heart.

As I mentioned in my lecture, I have had patients from the United States in whom previous treatment with artificial baths, as also with our gymnastic course, had produced good results. Nevertheless, there were not a few unsuccessful cases which were especially due to the fact that the gymnastics, instead of consisting of systematic resistance exercises, were carried on by an inexperienced operator, mostly in the form of calisthenics. As to the dosing of the ingredients of the bath by the use of ready manufactured articles, I have alluded to heretofore. They are unsatisfactory unless the amount of CO_2 can be properly graduated.

In conclusion, I would like to repeat that for the carrying out of our course of treatment careful observation on the part of an experienced physician is required. Under such conditions, however, the possibility is given of attaining satisfactory results.

THE OCCASIONAL LONG DURATION OF BRAIN TUMOR.

WITH THE REPORT OF A CASE OF JACKSONIAN EPILEPSY OF EIGHT YEARS' DURATION AS THE ONLY SIGN OF A SMALL CEREBRAL GLIOMA.[1]

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Remarks by Dr. Spiller.

The existence of symptoms of cerebral tumor during a period of eight years, with the finding at the end of that time of a tumor 1.5 cm. by 1.5 cm. by 0.5 cm., is so remarkable that the following case seems worthy of report:

Woods, aged sixty years, entered my service in the Philadelphia General Hospital June 17, 1904.

On examination after admission he wrinkled his forehead well on each side. The pupils were equal and regular in outline and reacted to light and in accommodation and convergence. The movements of the eyeballs were good. The tongue was protruded in the median line.

He was seen June 18 by Dr. Weisenburg, when the following notes were made: He had been well until eight years previously, at which time on one occasion he felt dizzy, and suddenly had twitching in his left fingers, then the

[1] Read April 3, 1907.

twitching extended to the left shoulder and down the left side. He does not know how much time elapsed before he had a second attack. He had been getting worse during the past four or five years. His mentality is affected and he has some failure of memory. He has had many convulsions during the past four or five years, and the night before admission had convulsions all night. He knows when they are coming on because he is "worked up," as he expresses it, before they appear. They are confined to the left side. The nurse states that he has had many convulsions since he has been in the hospital, and that they have all been confined to the left side. The patient says that after the convulsions he loses power in the left limbs, especially in the lower limb, and that the limbs feel "numb and dead." The sensation of the left limbs is never normal, and since his first convulsion eight years ago the left limbs have not been so strong as they were previously. He has headache and dizziness when he has convulsions, but never vomits. His sight, he thinks, is good. He denies all venereal infection and says he drank little.

No impairment of stereognostic perception is detected, and sense of position is normal, as are also sensations of touch and pain in both upper limbs. The left limbs are not wasted. The masseter muscles contract normally.

He was seen by me June 20, when the following notes were made:

In a spasm observed by me both upper limbs became rigid, the face was drawn forcibly to the left, and the eyeballs also were drawn to the extreme left. The eyelids were closed. In about a minute the tonic spasm of the left side of the face and left upper limb gave place to clonic spasms; the left lower limb also was thrown into clonic spasms. So soon as the clonic spasms began on the left side of the body the right upper and lower limbs became partially relaxed. No clonic spasms were seen on the right side of the body or face. The tongue was not drawn to either side. The attack lasted one or two minutes.

In another attack the spasms were similar to those already described. The eyelids on each side were thrown into clonic spasms and the convulsive movements were equally intense in the lids of each side and in each side of the forehead. There were no clonic spasms of the muscles of the eyeballs. The right side of the lower part of the face was not implicated in the clonic movements.

The wrinkles of the forehead may not be quite so deep on the left side as on the right when the man looks upward. The left upper eyelid is more easily raised by the examiner than the right. When he attempts to smile the left nasolabial fold is not quite so deep as the right. He does not draw up the left corner of the mouth so well as the right. Sensation of pain is preserved in each side of the face, but the mental state does not permit an examination of tactile sensation. The tongue is protruded straight, is not atrophied and shows no fibrillary tremors. The man obeys simple commands and seems to understand what is said to him, although he is not very intelligent.

The left upper limb is very weak and he is unable to move any part of this limb, but the weakness was not so great yesterday. The biceps tendon reflex is almost abolished on the left side. The left triceps reflex is present, but is not very prompt. Pin-prick seems to be felt promptly in the left upper limb. It is impossible to get the patient to fix his attention on the examination of tactile sensation. The movements of the right upper limb are free at all parts and the grasp of the right hand is good. The biceps tendon and triceps tendon reflexes are not very distinct on the right side. He cannot recognize today any objects placed in the left hand, although he recognizes them promptly when they are placed in the right hand.

The movements in the right lower limb are good, but the left lower limb is completely paralyzed. The patellar reflex is present on each side, and distinctly prompter on the left side. Ankle clonus and Achilles tendon reflex are not present on either side. The Babinski reflex is distinct on the left side, the big toe being moved upward, but is not so distinct on the right side. Pin-prick is felt distinctly in each lower limb.

In a third convulsion seen by me the muscles of mastication on both sides became involved. Five convulsive attacks were observed during an examination lasting one hour, and they were all of the same character.

Dr. Hansell examined the eyes and reported: O. D., senile choroidal atrophy; O. S., senile choroidal atrophy; otherwise eyes are in good condition for the age of the patient.

June 22. The man cannot be aroused, and is said to have a convulsion every few minutes.

He was referred to Dr. Edward Martin's service for operation and on June 23 an osteoplastic flap was raised. The upper line was ½ inch to the right of the midline and extended about 2¼ inches in front and 1¾ inches behind the fissure of Rolando. The base line was about at the upper border of the auricle and extended one inch in front and one inch behind the end of the fissure of Rolando. The portion of the brain at the anterior part of the opening was paler and palpation seemed to Dr. Martin to show that this portion was not so dense as that more posteriorly, and it was suggestive of a subcortical lesion such as a cyst. This area when explored appeared to be somewhat softened. A small piece of this apparently softened tissue was removed for microscopic study.

The convulsions confined to the left side continued after the operation, beginning within a few hours. From 8.45 P.M., June 23, to 7 A.M., June 24, the patient had forty-one convulsions confined to the left side. The convulsions occurred frequently during the few days preceding death, and the patient lay in the position of pleurosthotonos, with the body drawn to the left and the eyes partially drawn to the left even during the intermissions between the convulsions. In the convulsions the abdominal muscles on the left side were

in tonic contraction. The man became gradually weaker and died June 25 1904, the convulsions continuing until death.

Only a portion of the right hemisphere was obtained at the necropsy. After this hemisphere had been hardened in 10 per cent. formalin, horizontal sections were made through it. The portion which seemed soft at the operation was found to be the seat of a small subcortical tumor, not reaching quite to the surface of the brain (Figs. 1 and 2). This tumor measured 1.5 cm. by 1.5 cm. by 0.5 cm. from above downward. It was situated in the posterior end of the second frontal convolution and did not extend into the precentral convolution. Microscopic examination showed it to be a glioma.

FIG. 1.—Photograph of a portion of the right cerebral hemisphere. The line *a* indicates the position of the tumor and the level of the horizontal sections shown in Fig. 2.

The continuance of the convulsions, notwithstanding the exposure of the brain by an osteoplastic flap and relief thereby of intracranial pressure, was suggestive of an intracranial lesion causing irritation. In a case of mine of idiopathic epilepsy with convulsions of the Jacksonian type, recently operated upon by Dr. C. H. Frazier, the exposure of the brain caused a marked arrest of the convulsions.

The implication in the convulsions of the muscles on both sides

innervated by the facial nerve, only in the upper part of the face, and of the muscles of mastication on both sides is interesting, and is probably to be explained by the more nearly equal innervation from both sides of the brain of those muscles on each side of the body that commonly functionate together. This bilateral implication of the muscles of the upper part of the face in convulsions otherwise Jacksonian in type I have observed repeatedly. Interesting also was the deviation of the eyes to the left during convulsions of the left side of the body. In reporting a similar case

FIG. 2.—Horizontal sections showing the tumor (*a*) in situ.

in 1902 I remarked that: "This clinical observation supports the view that the chief centre for conjugate deviation must be near the motor centres of the limbs, because if these centres were widely separated we should not expect in a case like this, in which the convulsions were confined to one side of the body, to find conjugate deviation of the head and eyes during the convulsions."[1] The present case is valuable because the movements of the eyeballs

[1] Journal of Nervous and Mental Disease, 1903, p. 161.

to the left occurred only during the convulsions and the tumor was in the posterior part of the second frontal convolution, the portion of the brain believed to be the chief centre for lateral movements of the eyeballs. I have recently, however, had a case in which more persistent conjugate movements of the eyeballs were produced by a hemorrhage in the parietoöccipital region.

The most interesting feature of this case is the duration of the Jacksonian convulsions during eight years, and resulting from so small a tumor; for it is presumable that the tumor was the cause of the convulsions. We are inclined to give a grave prognosis when a diagnosis of cerebral tumor is made, and properly so, but it is well to remember that occasionally a tumor may grow very slowly, especially if it is a glioma, and may still be small after several years.

A glioma may grow to large size without causing symptoms. Thus in a case reported by Rosenblath,[1] a large, partially calcified glioma of the left frontal lobe was found, but symptoms are said to have been present only about five weeks and to have developed after a fall. In another case the symptoms of the glioma had been present only three or four weeks. As Rosenblath says, there are more cases reported of glioma with a long course than with a short one, but those that have existed for years, even decennaries, are such as appear macroscopically as hypertrophied parts of the brain. The soft tumors, rich in cells, are of more rapid growth.

I have seen recently in consultation with Dr. J. W. McConnell a case in which a large glioma of the right frontal lobe had caused symptoms only during the six weeks preceding death. This case will be reported by Dr. McConnell.

The occasional long duration of brain tumors has been discussed recently by H. H. Hoppe.[2] He says that some cases with unusually long remissions of the symptoms, like Osler's case, finally end fatally and he refers to the cases reported by Oppenheim, Gowers, Bernhardt, and Russell.

"Psammoma, lipoma, and cholesteatoma may attain a certain

[1] Deutsche Zeitschrift f. Nervenheilk., vol. xxxi, Nrs. 5 und 6, p. 342.
[2] Journal of Nervous and Mental Disease, February, 1907.

size and then cease to grow. Cysticerci and echinococci may die and shrink. The observations confirmed by autopsy are exceedingly rare. Nonne was able to find but four cases, those of Bruns, (Oppenheim, and Simeon.

"Aneurysms may cease to grow or become obliterated by the formation of a clot and the brain accommodates itself to the pressure (Oppenheim, Hutchinson, Hodgson, and Humble). Solitary tubercles may undergo cascation, calcification, and then become encapsulated, causing no further damage (Wernicke, Starr, Knapp, Gowers, Babinski, and Sahlberg). These observations are confirmed by the pathological observations of Simeon, who reports an autopsy in which a calcified tubercle was found which must have been in the brain for thirty years. Kirschberger's case shows how a tubercle may cause the signs of a brain tumor for a year and a half and the patient recover and remain well for six and one-half years. The autopsy in this case showed that the tubercle had become calcified. Gumma may become absorbed and disappear." [To my mind the absorption of a macroscopic gumma is doubtful.]

"Long remissions and even permanent disappearance of symptoms may occur in brain tumor, as numerous cases on record show. These cases, however, would hardly come under the head of pseudo-tumors with a complete disappearance of symptoms, because they had been regarded during life as cases of epilepsy of many years' duration, and after death partly or completely ossified tumors had been found as the cause of the epilepsy."

Hoppe thinks that a case he has observed shows that a pathological mass may be present in the cortex of the brain for forty years and cause no interference with the ordinary daily life of an individual. A man, aged sixty years, died in his service at the Cincinnati Hospital from acute meningitis. He stated that at the age of twenty-one his left arm became paralyzed, but that it soon recovered. He had lived the life of a farmer and teamster for the past forty years. With the exception of some weakness of the left arm and a constant headache he had always been well.

The autopsy revealed a hard, indurated, cartilaginous mass about the size and shape of a peanut, situated in the cortex, at

the posterior end of the first frontal convolution of the right side, and pressing upon the ascending frontal convolution. This tumor was partly cortical and partly subcortical, was not firmly adherent, and was surrounded by recent softening. On splitting it open a very hard, stony, calcareous centre, with a hard, cartilaginous covering was found.

The paralysis of motion and disturbance of sensation of the left limb in my patient were probably the result of exhaustion from the convulsions, and these symptoms became more intense as the spasms continued. Death was probably caused by exhaustion. It is remarkable that the motor cortex was not invaded.

Even when the brain was exposed at the operation we could not be sure of the existence of a tumor, although we found an area which appeared to be pathological and was the diseased cortex over the tumor. It did not seem advisable to excise this, as we could not be certain of the nature of the lesion, but from the later developments it is much to be regretted that the exeision was not performed.

Where Jacksonian convulsions are persistent, even though there may be no other symptom, it seems advisable to operate. We probably run less risk by operating than we do by permitting the convulsions to continue without surgical intervention, although we should remember that occasionally status hemiepilepticus may occur without organic lesion, as emphasized especially by Leo Müller,[1] Nonne,[2] and Bernhardt.[3] In another case in which Jacksonian convulsions were the only symptoms I recommended operation and a small tumor was found and excised. It is in cases of cerebral tumor such as these that we may hope the most from surgery, and probably only when a glioma is so small are we able to fully remove it. I am indebted to Dr. Alfred Reginald Allen for the photographs.

[1] Deutsch. Zeit. f. Nervenheilk., vol. xxviii.
[2] Neurol. Centralb., 1906, Nr. 12, p. 589.
[3] Berl. klin. Woch., November 5, 1906, p. 1443.

Remarks by Dr. Martin.

At the time this patient presented himself to the surgical ward for operation his condition was such as to justify no good from a conservative treatment and very little from operation. Since, however, localizing symptoms were persistent and very characteristic, since the exposure of the brain can be accomplished rapidly and with little shock or hemorrhage, an osteoplastic flap laid out by Dr. Spiller in suchwise as to give free access to the Rolandic area was rapidly turned back. Bleeding from the scalp wound was obviated by an elastic ligature passed around the skull from the forehead to the occiput and secured from slipping by three catgut sutures. The electric osteotome failed to work because of the burning of the fuse. By means of four trephine openings and a powerful set of rongeur forceps the bone was turned back almost as rapidly as would have been the case with the saw and cutting drill. The dura appeared normal and was pulsating. It was turned back, exposing a soft, bleached area merging with the healthy surrounding brain by imperceptible gradations. A portion of this was excised for microscopic examination. The dura was sutured and the osteoplastic flap brought back to position. There was very little bleeding and no appreciable shock as the result of this operation and the wound ran a reactionless course.

The matter to be regretted is that the operation was incomplete. The neurological localization was perfect. The seat of the lesion was regioned, but because of the lack of definite surface findings and the unfavorable condition of the patient a thorough subcortical exploration was not made. Such an exploration was certainly justified by the symptoms, and in this particular instance it might have resulted in a cure.

PREVENTIVE MEDICINE AND EDUCATION.[1]

By WILLIAM S. WADSWORTH, M.D.

As a close observer of the workings and results of most types of education for over twenty-years, I may be pardoned for my temerity in plunging into a field preëmpted by young experts of a couple of years' study and old experts of circumscribed experience. I am going to point out a few things that may be observed by anyone, which ought not to be. As intelligent, serious men you can do as you think you should about helping to bring about improvements.

No excuse is necessary for presenting such a paper, rather would it be in order to inquire why the matter had passed so long without serious attention by a body whose greatest duty is to consider the health of the community.

There have been very valuable papers on small parts of the field, such as those on the eyes in school-children, which have yielded excellent results.

Now and then some remark is passed about contagious diseases in public schools or about physical examination of pupils.

When we stop and consider, it is astonishing that the medical profession has taken such a small part in educational studies, plans, and practice. No class in the community should be so well adapted to look after certain parts of the scheme of instruction for any sort of education; no body more rightfully than this college should take a share in the educational scheme of the City and the State.

Now that both City and State have at last begun to recognize

[1] Read April 3, 1907

the importance of medical service in sanitary work, we may work with reasonable hope for the introduction of medical wisdom into educational affairs. Preventive medicine may be spoken of now without fear of ridicule, even among the learned, and the great mass of men with common sense are beginning to grasp something of its meaning. Our people are beginning to be "city broken," and it is not so hard to get their ears for a word of medical wisdom.

Preventive medicine may, for the present discussion, be defined as the art of applying the arts and sciences, usually termed medical, to the prevention of the production and spread of disease. I would plead for the broadest conception of both the arts and sciences, including much that has as yet received but scanty recognition from the rank and file of the profession.

And I would insist on the study of pathogenic tendencies and influences that differ from the disease, which often develop along their courses, as fibrinogen differs from fibrin, but which should be regarded as prediseases or pathogens; and as medical men treat insanity, so must we study mental sciences and mental pathogens.

The second part of our title, education, naturally includes an enormous variety of arts.

Every human quality, physical, mental, and moral, is capable of being modified or influenced by surroundings and has been made the object of a system of education, often of a variety of systems depending on the possible effects.

The great field of education naturally falls into groups of execution.

The home, the public system, private and special institutions, higher schools, post-institutional or public instruction, spasmodic (such as books, papers, lectures), or the concerted efforts, such as acts of assembly, councils, societies.

The basis of all pedagogic work must be a knowledge of physiology and psychology and ethics, and no wise system can be devised that ignores pathology and pathogenesis.

It would seem almost an axiom that medical men should be advisers in all the different systems for the education of minds or bodies, if not of characters.

It is possible that the profession is slightly at fault in not preparing itself in things mental, for incredible as it may appear, to intelligent persons, there are prominent medical men in the community who publicly sneer at all study of psychology, who yet regard themselves as capable of giving opinions on education, insanity, degeneration, mental and moral, even dogmatize on matters of higher education. While such remnants of medieval darkness still remain among us it may be improper to ask the educated part of the community to pay much attention to the rank and file of the profession. It may be years before the mass of the medical profession is mind-wise enough to be other than a detriment to education, but there is a tendency, which I believe is growing, to fit the medical profession for its higher functions as doctors of men in their entirety, not simply as viscera jugglers.

Certain it is, that there is a growing number of men in the profession who are capable, by nature and education, of grasping problems of education, and it is from such men that education is to receive great aid in the future, in avoiding the destructive methods so common in the past and present.

Preventive medicine should not be limited simply to the germicidal side, as is too often the case.

It is well to prevent smallpox and scarlet fever, to examine heads and throats and eyes, chests and teeth, and to provide proper seats and desks to prevent malformation, to have clean rooms and books and fresh air and sunlight in every place in school, college, or home.

It might possibly be well to have pure water and properly prepared food for growing children. It might be well even to restrict the sale of pretzels and bad candy, even though the proceeds do help to adorn the walls of the school; but all these isolated matters are not the essential thing. We should start at the beginnings, with a purpose to eliminate all disease and prevent all sorts of pathogenesis in every special sort of education, but, most important, in all public education.

It is to public education that I wish we could bend our best energies for a time, for the health of the community depends on it, and it can be reached and controlled because it is under the

charge of the common sense loving part of the community and not in the hands of a few more or less misguided pedants, as is so much of our special education.

The relation of preventive medicine to public education may be divided for convenience into:

1. Board of Health work, which includes physical examination of the children, care of actual disease, rules for prevention of spread of communicable diseases; and all sanitary regulations as to books, school-houses, and personal hygiene.

2. Board of Education work, which includes the physical and psychic effect of the scheme of study, the full complete physiology of the child before, while, and after being "educated." The mental cost and the physical cost, together with the result attained and a very close scrutiny of the wreckage.

Possibly the day may come when a broader policy of moral training and supervision with due regard to moral health will be followed.

3. The Communities' side. This will include not simply the question whether the child has ruined its eyes or its back or its mind or its digestion at school, or contracted some foul disease or worse habit, or moral or mental insanity, but will go still farther and determine whether the child has learned to become part of a sane, wholesome community of human beings; whether after reading and writing and Latin and algebra a girl is fit to make a home and have children without the assistance of some uneducated person to tell her what to do, how to do it, and generally to be mistress of her home, whether, in fact, the children are developed or stunted on the one hand, and whether they are taught those things needful for all social units and intelligent persons to know, or only received such vague and valueless gymnastics as will give them vanities rather than wisdom.

Whether they are duly passed apprentices of the art of living or only misguided, misfit psychic entities who must begin all over again or fall by the wayside as failures, because they have had their vitality sapped, their minds perturbed and cramped and their morals obliterated.

I am not willing to accept the narrow limits for the term preventive medicine.

It does and must include all the art of prevention of all the diseases, by means direct and by influences indirect.

Not simply such patently wise provisions as cutting out adenoids, refracting eyes, vaccinating arms, isolating contagious cases, but must extend to the very basis of all educational processes, including inculating rational habits of using the body and mind, and the imparting instruction that will enable the pupils to become wise in sanitary affairs after they leave school.

Not experts, but sane, well-equipped, physiological mechanics capable of running the most remarkable compound engine in the world, the human body.

Am I asking too much? Would you give a child a thousand-dollar instrument to manage without carefully instructing him about it and making reasonably sure he was fit to use it? Would you give him watches and steam-engines to play with, simply on the strength of geography, and Latin? What would you say of your neighbor who let his children run his automobile without being first sure they knew how? Look all about you at the incurable dyspepsias of body and mind and say whether it is not a little absurd to continue to ignore these things.

Preventive medicine in education, when properly developed, will do certain things better than they are at present done.

It will absolutely stop some deadly practices at present quite common, and it will take up many things now so sadly neglected, but appreciated by a few. It will do some things that would be quite a surprise to many leaders of this day. From the physical side every child should have a careful physical examination before admission, more searching than its mental one, and if the physical examination is not satisfactory the child should not be tortured and injured by the methods that alone are suitable for the reasonably healthy one, but are wholly unsuitable for the sick, weak, and defective. Every time a child is examined for promotion to more difficult work, his physical basis should be determined, and if there is not physical improvement the reason should be found and an

adjustment made. Suitable records should be kept which could be used as a basis for improved methods.

The usual disregard of the body in city schools is a relic of barbarism, where everybody lived out of doors and healthy surroundings and country air were common.

The day is coming when the children of our cities will have to be colonized for a time each year in the country as part of their education, mental as well as physical.

How many teachers dare or care to hold back a bright scholar who is ruining his body, to make a show mind which will have a deadly debt, if it continues to exist, in that ruined body? And how often it pays that debt by going into wreckage! A bright mind in a bad body is wonderfully apt to become bad. Physical defect, weakness, disproportion, and disease must be prevented before we have a humane and wise system of education. For the mental and moral sides much the same laws hold: tests of attention, memory, will, adaptability, imagination, abstraction, deduction, correlation, are as easily applied as are the ordinary examinations; but instead of putting a premium on monstrosities when discovered and so blighting hundreds of fairly good minds as we see every day, a rational conception of the psychology and physiology of excesses, mental, moral, and physical, would lead to very different methods of work. Hardly a day goes by but I see examples of mental, moral, and physical debauches, the result of miseducation.

It is not necessary to go to the terrible extremes when the strained, misdirected mind breaks down under the strain of life to give suicide and the wilder crimes and insanity. Many a physical disease have I seen due to a mental debauch; many degenerations result from mental excesses.

Diseases of perception, memory, attention, judgment, and will are the common results of mind strains resulting from bad education. Preventive medicine has a large field in this matter of mental disorders.

Not a few mental disorders appear as the result of neglect of parts of the mental anatomy just as physical atrophies and disorders arise from disease.

Preventive medicine should and will demand that the functions of body and mind be given developing exercise, sufficient for growth and health, but not excessive, not for gallery play effect, but for development and health.

We shall demand a code in matters of the mind quite as civilized as that demanded by a certain *passe pedant* for football; then the terrible wreckage will be lessened.

I am tempted to go into the horrible fads and freak educational experiments devised by over-read women, impractical pedants, lady-like minds in male bodies governing educational institutions, rabid emotionalists, relentless pursuers of chosen branches and seekers after emotional concepts generally; but only the rich man's children can attain to these realms of the unutterable in education, where men plant the fires of hell in the young minds which burn out in the darkness of madness.

I can only wish for more sanity in high places in higher education, that the splendid young of the land may live and not die. Perhaps the only way to better these things will be to have our Deans, Presidents, and Superintendants examined periodically, by an alienist commission, with special care to detect manias for experimenting in the overtaxing of the young. Throughout all education, then, must run a conception of the nature of young mind and the significance of latent and delayed traits. These are some of the problems of the educator as they present themselves to the medical man who sees what is going on.

In closing I wish it to be clearly understood that while I have dissected our systems of education without fear or favor, I am not making any local criticism. What I have said applies more to Massachusetts than to Pennsylvania and more to many of our Western cities than to Philadelphia; more to Germany than to America.

I have sought to bring before you some considerations of fundamental importance that will be of service to those who care to think and labor for the good of the people. You are fortunate in having one present who will speak from great experience, hard working, sane thinking, and a splendid enthusiasm—Dr. Brumbaugh.

DISCUSSION.

Dr. Martin G. Brumbaugh: I want to express my appreciation of the privilege of appearing here tonight to take part in this discussion. I wish, also, to thank the author of the paper you have just heard for bringing to our attention the relationship between medicine and the school; in other words, the work which is yours on the one hand, and the schools on the other. I am perfectly willing to be put on trial tonight, as indicated in the last paragraph of the doctor's paper, and you may consider yourselves the commission in alieney, if you will, and I will be the subject for the time being that you may ascertain, whether I am sane or insane as I talk. I want to say to you, as representing the profession of medicine, that some of the things that do concern the school lie very close to the work that you have to do in promoting the welfare of the people in the school.

It seems to me that we have to keep in mind the fact that we are expected in the public school—I do not speak of other types of education—to give to the community after a certain number of years a pretty definite sort of educational product. To meet that expectation we are obliged to accept a course of study in which is embraced various elements of procedure through which the child must pass in order to attain the result expected by the community. Consequently, this course of study becomes at once the subject of criticism and attack. Among other things, it is said that the course of study is responsible for all the sicknesses and ills of childhood; that if there were no course of study there would be no disease, and we would live at once in ideal society.

We find, for instance, that a great many of the children come to school wholly unsuited for the work of the day because of the kind of food given them; that another group come unprepared due to the fact that they have social dissipation, spending every evening in society's forms and ways. I am not sufficiently acquainted with that form of life to describe the thing, but they are out in the drawing-room when they ought to be sleeping, and they come to us enervated, their nerves on edge, and, of course, we have a case of discipline on hand the next day.

Then, as doctors of medicine and advisers of mothers, you ought to correct the tendency to divert a part of the educational energy of the child from the real work of the school to all sorts of special types of training. Some children are required to go off from school half an hour earlier three times a week to take a music lession. Others ask to be excused to take a gymnasium lesson, another horseback riding. An endless series of these things takes a large part of the energy of the child, and these are not taken into account in summing up the occasions for the break in the health of the child. All these things being overlooked, the school is charged as the one cause of the trouble. I think this

is a matter of sufficient importance for our joint consultation and effort to remove.

The doctor has hinted at another matter. You, as physicians—and I speak this very advisedly in the presence of my own family physician—have a tremendous influence in the right ordering of the life of the child during its school years. From my experience with students of medicine at the University and in other schools, I doubt seriously and honestly whether the present course of discipline through which a man passes to become a doctor of medicine fits him in any adequate way to advise a home about the education of its child. If I have a cold or any other condition of my body which leads me to feel that I have impaired my working capacity or unfitted me for my every-day services, I call for my physician and turn the question over to him. It seems to me that a great many doctors are willing to advise along a score of lessons in the economy of life of the child, about which they know no more than the ordinary citizen, and some of them even less. I say that in all brotherly kindness, but in all brotherly sincerity I believe the time has come when you will have to modify the technical aspects of your training and put into the medical course a series of discussions giving a broader insight into the intellectual needs, limitations, and possibilities of children, so that when your present students become advisers in homes they can give some directions which will harmonize with the better thought of the educators of the community.

Some time ago I had occasion to look up the cycle of disease as it produces death, and I found that in the month of June—a fact probably well known to you—the percentage is less, with a gradually increasing percentage through the cycles of the winter months. Our vital statistics show that between the ages of five and twenty-five there is a high mortality in the month of March. It might seem to some people that the rising death rate through the months of the school year was pretty fair evidence that the school-teacher is getting in his deadly work. The facts are that conditions over which he has no control bring to his pupils disease and death at the very time in the school year when the educational processes ought to reach their climax of efficiency. Just when the teacher has come to the point in the years of instruction when he would do his supremest work, disease and death break the ranks of his school and scatter his possibilities of successful work. A serious question is, How to keep the health of the child through the cycle of the months from causes other than those of overwork in the curriculum itself.

The answer, so far as we have been able to solve it in our own minds, is that we must lay a large amount of stress and emphasis and time upon the play side of life during the school year. We must come to understand that no amount of indoor exercises, marching in a dusty room, going through one form of calisthenics, or even going to the gymnasium and passing through a series of gymnastic exercises, will in any adequate way serve the need that a child

has for vigorous exercise in the free open air. So we have just commenced, under the law which went into effect a year ago, a new department of education for public schools in this city—a department of physical education. The business of that department will be to coöperate with the medical experts who visit the schools to care for the child's physical unfolding in the same scientific and continuous way that we now care for his intellectual unfolding, and I look to that department to accomplish a very great deal of good for the children of the city of Philadelphia. It is bound to bring to pass the declaration by our board of education of the principle that no child shall be promoted who is not both intellectually and physically competent to perform the work of the next grade. I think all will subscribe to the doctrine that he who buys knowledge at the price of his health pays more for knowledge than it is worth.

The second thing that will result from this new department of education is the establishment of out-of-door playgrounds for the children through the city of Philadelphia. When I think of the paucity of opportunity for out-of-door exercise for children of Philadelphia, I quite understand some of the unfortunate conditions that prevail in the school itself. The child that plays freely in the open air under normal conditions is more easily governed and is more ready to take up the work of the school proper.

I believe that the boy who plays under proper supervision is a cleaner boy morally, because he is a saner boy physically, and, therefore, he is a more desirable product in the school physically, morally, and intellectually.

In the neighborhood of 36th and Walnut Streets there is a side street which, by its construction, provides an incline of several feet. The other day I saw a little fellow standing beside this place while the other boys were sliding down into Walnut Street. I said to him, "What are you doing here?" His answer was, "I am watching." "What are you watching?" I asked. "Autos and cops," he replied. That boy, out of the exercise, watching for the arm of the law and the death-trap flitting by, while his comrades would slide down a little side street on an incline 150 feet long! You cannot have sane minds and morals under those conditions. This great city has one little public playground, called Starr Garden Park, somewhere—I suppose Dr. Coplin knows where it is. Yesterday I had the wardens of the Eastern Penitentiary lay aside a piece of ground outside the wall for a children's playground.

The medical profession can put into the minds of men and women everywhere the importance of free outdoor life for the child. I believe that that, more than any modification of the course of study, will bring the result we all long for.

Only the medical profession can give to the superintendent of schools and to others responsible for the results of these schools the definite scientific knowledge which we need to gauge the operation of that course of study upon the children of this city. You get the child that breaks in the school. Your hand

is expected to restore him to normal conditions; your investigation, and yours only, reveals the awful physical loss that comes to the child who breaks in the school. I should like to have—and I come here in answer to Dr. Wadsworth's invitation more for this purpose than for any other—from you, any time and always when you have occasion to know of these things, a statement of each case as it is known to you.

Many physicians have spoken to me of the effect of the High School upon the girls as they pass through the adolescent age. Hundreds of the best young girls in Philadelphia are graduated from it, but a large percentage drop out. They are beyond the age of compulsory attendance, and they are simply lost to the school system. Many of them, I have no doubt, have a story back of their school life which you alone know. We want specific and accurate knowledge in order to make the school a safe place for growing children.

On the other hand, the inclination of many persons is to lay upon the school the responsibility for impairment of the health of their children. They do not look into the question of diet in their own homes, to the question of sanitation, hours of sleep and recreation, to the outside study forced upon the children, and the burden of the loss of the health of the children is laid at the door of the school. From your scientific knowledge of the case you are able to set the people right, so that the public school shall not bear more than its rightful share of the criticism for the effect it has upon the lives of the boys and girls of the city.

We need in the profession of teaching much more than we have before the aid of the medical profession in indicating the reasonable limits within which we shall work upon these growing children. We make our experiments, we measure the children, draw our physiological deductions; but there is a side of the child that you know and that we do not know. Your training gives you an insight which our training cannot give. You, therefore, ought to speak with us upon the limits of action upon these children.

Many questions need consideration: How long shall a child's recess time be? How long shall he sit in the school busily engaged upon some intellectual work before he is allowed to play? Shall we have recess times in our schools? These are a few of many questions upon which we school men can only dogmatize. To you we look for the utterance which shall produce the utmost good to the children. Any suggestion coming from the medical profession will always be welcomed, and I shall be very glad indeed to confer with you at any time to the end that we shall build here, in the city of Philadelphia, fine minds, strong bodies, and clean consciences in our boys and in our girls.

Dr. Elmer: A case came to my notice this afternoon which is in line with the discussion. It was that of a young girl brought by her mother for a physical examination, and sent by her gymnasium teacher. She is fifteen years of age, and is developing an incipient curvature. In questioning her, I was impressed

with the fact that too much is expected of the girls—the boys, as a rule, take care of themselves; during their hours out of school they will engage in active out-of-door play. This girl of fifteen was in school from nine until two, with half an hour for lunch, and reached home a little before three o'clock. When she came for examination she had a pile of books resting on her right arm. I learned that her study hours extended from seven to ten in the evening and from four to five in the afternoon. She was also expected to take a music lesson; so the child really had such a limited amount of outdoor life and fresh air exercise that it seemed as if too much was expected of her in keeping up to the standard in the High School grade. She told me that she was in the habit of sitting at her desk sidewise during the writing lesson, a faulty position. Girls of this age are required to study so much out of school that they do not have sufficient time for exercise. In the case of this girl she can be taken in hand and saved from what ultimately might be a serious condition. The individual teachers seem to ignore the fact that it is the encroachment upon the child's time when at home which imposes the tax upon them.

Dr. H. B. Allyn: I am glad to have Dr. Brumbaugh emphasize the fact that this matter of education must be looked upon from more points of view than simply the amount of knowledge of all kinds that can be crowded into the minds of boys and girls. His emphasis upon the importance of playgrounds, which are important for the moral as well as the physical well-being of the child, his statement that he cannot train children unless they have a large amount of outdoor life, and the fact that he seeks the advice of physicians upon these subjects, show his breadth of view, and should make us glad to coöperate with him.

Dr. Wadsworth (closes): I want to say a word of appreciation of Dr. Brumbaugh's coming here and of what he has said. I think we would do well if we made it a part of our duty as an organization to have such topics occasionally before us systematically. I think if we had a little more of this sort of thing occasionally it would be worth while.

RUPTURE OF AN AORTIC ANEURYSM IN A CHILD OF FOUR YEARS.[1]

By ROBERT N. WILLSON, M.D.,

AND

ALEXANDER MARCY, Jr., M.D.

The following case is reported as of interest to the clinician as well as to the pathologist, especially in its bearing upon the relation between hereditary syphilis and lesions of the heart and vessels in early life:

M. E., a male child, was born October 19, 1903. He was the first child from the union of apparently healthy parents, born five years after their marriage. The labor was tedious and difficult, lasting eighteen hours before it was deemed wise to terminate it by instrumental delivery.

Both father and mother are living at this time, and both are thirty-four years of age. The father had the usual diseases of childhood. He hesitatingly denied having had a sore on the genitals, but admitted two distinct attacks of gonorrhea prior to marriage. At the age of twenty-one he began to experience convulsive seizures resembling epilepsy in all respects. These were at first extremely slight, though frequent, often as many as three or four in one week. There was complete unconsciousness, the patient learning of the convulsive feature of the attack only from his friends and family. He was treated for epilepsy by several neurologists in this city, but always with an increase in the number and severity of the attacks, rather than relief. Careful dieting and tonic treatment seemed to afford the only favorable influence. Mercury and the iodides had never been employed to his knowledge. These attacks still continue, though at seemingly increasing intervals. Apart from them his general health is good. The opportunity was not afforded to thoroughly examine the father, but it is of interest to note that his nose is distinctly sug-

[1] Read by invitation, April 3, 1907.

gestive of the saddle type. He shows no other outward marks of specific involvement, and even this is not perfectly developed.

The mother is also thirty-four years of age, and apparently well and strong. She presents no external evidences of lues, nor does she remember any symptoms that would lead her physician to suspect that she has ever been infected.

The paternal grandparents of the child are alive and well at the ages of sixty-seven and seventy, respectively. The maternal grandfather is also healthy at seventy. The maternal grandmother died at thirty-five of "lung trouble," probably tuberculosis.

At birth the child was cyanosed and breathless, artificial respiration being required to establish normal breathing. His weight was twelve pounds, his body well formed, and the physical development apparently perfect.

At six weeks of age he had a severe attack of bronchitis. A few weeks later he suffered from whooping-cough. While examining his chest during the bronchitis his physician (Dr. Marcy) noted a loud systolic murmur, heard best over the aortic cartilage to the right of the sternum, over the second and third interspaces. The murmur was so loud, however, that it could be heard over the entire chest, both anteriorly and posteriorly. As he had never before had an acute illness this murmur was assumed to be and probably was indicative of a congenital lesion. Compensation was good, and the circulatory supply to the surface and to the extremities subsequent to birth seemed always satisfactory. The general health was good, though his power of resistance to slight influences seemed poor. Occasionally he would suffer from an attack of spasmodic croup or a passing gastro-intestinal disturbance But aside from this and an occasional cold, he developed as would an ordinarily healthy child.

In June, 1905, he experienced what his mother described as a "fainting spell," but did not lose consciousness. Nothing further of interest occurred until his last illness beginning on November 17, 1906. This was ushered in by vomiting, with an active rigor, and fever. Careful examination failed to reveal a definite cause for the symptoms, and it was supposed that he was suffering from some gastro-intestinal infection. The stools were somewhat loose and offensive, containing much mucus and some undigested food. Rest in bed, limited feeding, and small doses of calomel and soda apparently relieved the symptoms. The improvement did not continue, however, and the rigor and fever repeated themselves time and again. A malarial infection was of course considered, and quinine given in liberal dosage. No improvement resulted. The fever came and went with painful regularity, excepting as to the time of day. The rigor did not always accompany the rise of temperature, nor did the latter persist throughout the same number of hours, nor reach the same height. Now it would appear in the morning, again in the afternoon, then toward evening, or during the night. As a rule it averaged

102° F., but on several occasions it went as high as 106° F. The interval was afebrile, and when free from fever the child was very bright and natural, and wished to play. With the temperature above normal, however, he was at once dull and listless, resenting interference on the part of nurse or doctor. At times he complained of distress, generally in the epigastrium, but occasionally in the upper portion of his chest beneath the sternum. Sometimes pain was referred to the neck, and he would say that "it hurt him to turn his head." Sometimes it would shoot to his feet, particularly to the great toe, sometimes of one foot, again of the other.

There was a gradual loss of flesh and strength, with a noticeably increasing anemia. The urine at first showed no pathological change. Later on hyalogranular casts were found, also a few red corpuscles, and one purely blood cast. Albumin was never detected. Frequent examinations found the lungs always normal, also the abdominal organs.

On December 13, 1906, we saw him in consultation, and obtained the following additional history: The boy had been happy and bright until about one month previous, when, as stated, he had begun to experience irregular and almost daily rigors and febrile attacks. During the preceding two days there had been present a slight cough. No expectoration was noted.

The physical examination found a well-developed child, evidently under the influence of a grave toxemia. The skin was sallow, almost of a lemon-yellow tint; the mucous membranes were blanched. The pharynx, mouth, and teeth showed nothing of particular bearing on the case. The anterior and posterior cervical glands, the submaxillary chain, as well as the axillary, epitrochlear, and inguinal series, were all enlarged, fibroid, and painless. There was no eruption upon the skin of face or body.

The chest was large and well developed. Over the episternal notch an expansile pulsation was evident. Over this and extending in all directions was a marked systolic vibratory thrill, perceptible over the entire upper chest, anteriorly and posteriorly. Beneath the membrane, and to right and left of the same for a distance of about two and one-half inches, the percussion note was absolutely flat. A loud systolic and diastolic, to-and-fro, almost continuous bruit was heard, with greatest intensity over the second interspace to the right of the sternum, transmitted over the entire precordia, and especially to the right scapular region. Both the second aortic and pulmonic sounds seemed to be diminished. The pulse rhythm at both apex and wrist was regular. Examination of the lungs discovered no other abnormality than a rapid respiratory rate, and a slight impairment of the play of the right upper lobe.

The abdomen appeared absolutely normal, including the liver and spleen, and other organs subject to examination. There was no edema of the extremities and face. The pupils were equal and normal, reacting promptly to light

and distance. The patellar reflexes were also normal. There was no rigidity of the nuchæ. Both radial pulses were similar in time and force. The arterial tension was high, and independent of this the arterial wall appeared slightly thickened as with sclerosis. There was no tracheal tug.

The blood examination showed the following: Hemoglobin, 49 per cent. (Dare); red corpuscles, 2,000,000; leukocytes, 28,000. Considerable poikilocytosis. Malarial plasmodia not found in fresh nor in stained specimen. No pigmentation of leukocytes. The differential count of leukocytes gave, of the polymorphonuclear type, 72 per cent.; lymphocytes, 14 per cent.; large mononuclear, 14 per cent. The absence of albumin in the urine and the presence of hyalogranular casts and a few red corpuscles have already been noted. The feces showed neither parasites nor ova, neither blood nor mucus macroscopically, but microscopically a few red corpuscles.

One week later, on December 24, 1906, we saw him again in consultation following a steady failure in physical condition. The face was now puffy, the tissues boggy, though there was no apparent pitting on pressure. The temperature at the time of examination was 104° F., the child now being constantly febrile. Rigors were only occasional, but very severe and distressing. The pallor had deepened to a dusky hue, the child very listless. There now appeared to be a small quantity of fluid in the abdomen, and also in the right pleural cavity. It was noted also that while the left carotid was still pulsating the left radial pulse had almost disappeared, all other physical signs remaining as before. The radial arteries were both distinctly palpable, and seemingly thicker than normal.

The blood showed a hemoglobin percentage of 36; the numerical relation of leukocytes to the red corpuscles was 1 to 50 in the fresh specimen. No malarial plasmodia were found. Many nucleated red corpuscles were evident. The father's history of epilepsy beginning at the twenty-first year, his saddle nose, the history of a urethral discharge following exposure to infection, a rather dubious denial of a primary sore, together with the result of our study and examination of the child, seemed to warrant the opinion formed provisionally at our first meeting, that the case was one of congenital syphilis.

The thoracic condition did not seem by any means clear. Aneurysm was considered, and in an adult would have been determined upon as certainly present, but was excluded from the diagnosis as unlikely, owing to the extreme youth of the child. It appeared more probable that a mass of enlarged bronchial glands, either syphilitic or tuberculous (probably the former), was present in conjunction with a congenital syphilitic endocarditis, presumably centred on the pulmonic or aortic valve.

Two days later, on December 26, after seeming brighter and better than for several days, the patient suddenly screamed and, throwing up his hands, expired.

The autopsy was performed by Dr. Willson, at Riverton, on December 28 1906, and gave the interesting data included in the following brief report.

Abstract. Body edematous, pitting along tibial surfaces. Glands everywhere enlarged.

Thorax: Pericardial sac distended and of a bluish appearance from contained blood. Heart small, pale, and contracted in systole. Aneurysm of ascending and transverse arch, ruptured into pericardial cavity, through an ulcerated opening about one centimeter in width. Considerable pericarditis evident along upper and outer area of visceral and parietal pericardial layers.

Aortic valve showed high-grade stenosis, its opening almost occluded. The pulmonic valve was normal. The aorta outside the valve showed extensive layers and patches of atheroma, the aortic wall very thick. Cardiac muscle very pale.

Lungs: Pale, anemic. About an ounce of fluid in the right pleural cavity. No adhesions. No consolidation.

Abdomen: Small quantity of fluid present. All tissues blanched. Liver large, hard, and suggestive of fibroid change. Spleen large and congested only. Stomach shows small submucous hemorrhages, otherwise normal. Intestines pale, no ulceration. Mesenteric glands along the ileum and cecum

enlarged and very dark. The kidneys showed deep congestion and considerable yellow, fatty deposit, especially along the cortical margin. The pancreas appeared normal.

The main interest in this case centres, of course, in the etiology, and in the question as to whether the aneurysm may or may not have been a congenital condition, synchronous in formation with the congenital valvular lesions. Indeed, it seems by no means unlikely that the loud systolic bruit and the rasping thrill evident over the whole chest wall shortly after birth were due to the aneurysm rather than to the extremely high-grade aortic stenosis which so almost completely obstructed the outflow from the ventricle as to raise a doubt whether a murmur could have been possible with the stenosis as the cause. It would appear probable to us that the aneurysm was of intra-uterine origin; that the ulcerative process which reached an advanced state in the aortic wall progressed after birth until it finally eroded its way through the adventitia into the pericardial cavity; and that some trifling additional strain upon a barrier already of gossamer thickness was sufficient to cause the rupture and the fatal outcome. There seems, moreover, to exist no room for doubt that the aneurysm was of syphilitic origin. If there were no other proof the high degree of sclerosis of the aorta, the typical patches of atheroma evident upon the interior of the vessel, the thickening of the radials in a child of four, the general glandular enlargement, all this in the absence of mercurial or any other medication that could have contributed to the sclerotic tendency, together with the important evidence of a congenital heart lesion, all of these by themselves inconclusive signs, we believe to be sufficient to warrant the diagnosis of latent hereditary syphilis, and consequent degeneration of the arterial walls and aneurysm. Other possible causes, such as alcohol and physical overstrain, which would require consideration in the adult, can be dismissed at once in infancy and early childhood. The father's spurious epilepsy and his suggestive venereal history render the conclusion practically certain.

It would appear that the case under discussion is the only instance noted in the literature of death by rupture of an aneurysm of the

thoracic aorta at such an early age. We find a number of instances of aneurysm of the thoracic aorta, of the cerebral arteries, also of the abdominal aorta, usually discovered at the autopsy. One of the youngest subjects that have come to our notice suffering from involvement of the arch is a child mentioned in the *Reports of the City Inspector of New York* for the period 1856 to 1864. He mentions one instance of aneurysm in a child between two and five years (not of the arch), one between five and ten years (of the arch), two between ten and fifteen (neither of the aorta), and an increasing number as the age rises.

Le Boutillier (*Amer. Jour. Med. Sci.*, May, 1906) has also recently collected a series of cases of aneurysm in early life, and himself reports one of the thoracic aorta in a child of nine years, still living. In his bibliography there are noted seven cases of thoracic aneurysm in children under ten years of age, all dying of some independent pathological condition, or still alive at the time of the report. The youngest of these cases was two years of age, the death being due to hemorrhagic smallpox, not to the aneurysm.

In most instances these aneurysms are the result of hereditary syphilitic change in the vessel walls, perhaps rarely to tuberculous or rheumatic arteritis, far less frequently (probably never in the case of the aortic arch) to thrombosis and other causes.

In Le Boutillier's case, as in that under discussion also, there would appear to be a possibility, at least that the paroxysmal effort in whooping-cough was a contributing causal influence.

While the case reported in this paper is undoubtedly an instance of a most rare condition, it is none the less of practical interest in its bearing upon the diagnosis of intrathoracic conditions in very young children.

DISCUSSION.

Dr. John H. Jopson: I looked up this subject a short time ago and was interested to find some 60 cases of extracranial aneurysm under twenty years of age had been collected by Le Boutillier. Intracranial aneurysm is more common in children than extracranial. In Le Boutillier's collection 18 were of the thoracic aorta and 5 of the abdominal aorta. One reference which I found was to a fetus of eight months with aneurysm of the abdominal aorta.

Regarding the origin of the condition, I think that embolism, arteriosclerosis, and tuberculosis are the most common causes. The case of the eight months' fetus is probably the very youngest case of aneurysm on record.

Dr. Willson (closes): My reference to the extremely young age was not with respect to aneurysm of an artery in *any* portion of the body, but to rupture of an aneurysm of the thoracic aorta. In the series of cases in the literature many are noted younger than ours, but not one of a ruptured aneurysm in a child as young as four years.

CHRONIC POLYCYTHEMIA AND CYANOSIS WITH ENLARGED SPLEEN (VAQUEZ'S DISEASE).[1]

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The syndrome chronic polycythemia and cyanosis with enlargement of the spleen is held by most writers to be a distinct clinical entity. This symptom-complex was first described by Vaquez,[2] who published a brief paper on the subject as early as 1892. It was discovered independently by Rendu and Widal[3] in association with primary tuberculosis of the spleen. More recently rather exhaustive studies of the subject have been undertaken by various observers and clinicians, more particularly Osler,[4] Türk,[5] Reckzeh,[6] Weber and Taylor, and others; and whilst these have somewhat increased our knowledge of the syndrome, quite divergent views are entertained relative to its nature and pathogenesis.

It should be understood at the outset that polycythemia, due to a deficiency in the plasma of the blood, a common condition attributable to a great variety of definite, ascertainable causes, such as acute diarrhœa, dysentery, cholera, and the like, should not be confused with true polycythemia with enlarged spleen of obscure origin. The abnormal increase in erythrocytes of congenital heart disease, valvular affections, adhesive pericarditis, obesity, a paralyzed extremity, and of high altitudes, in the opinion of most writers, likewise differ from the form under consideration. The hyperglobulism

[1] Read April 3, 1907, and at a meeting of the Academy of Medicine, Cleveland, Ohio, March 15, 1907.

[2] Compt.-rend. Soc. de biol., 1892; Bull. Soc. des hôpitaux, 1899, p. 579.

[3] Bull. et mém. Soc. des hôpitaux, 1899, III Ser., p. 528.

[4] Trans. Assoc. Amer. Phys., 1903, p. 316

[5] Wien. klin. Woch., 1904, Nrs. 6 u. 7.

[6] Ztschr. f. klin. Med., 1905, lvii, 215.

observed in ether anesthesia and phosphorus poisoning should also be excluded.

Etiology and Pathogenesis. At present writing it is believed by certain observers that stagnation of the blood due to a variety of factors is the sole cause of the symptom-complex. For example, in a case reported by Reckzeh, occurring in a young man, a malignant tumor of the thymus gland and lung caused gradual compression of the superior vena cava followed by polycythemia (limited, however, to that portion of the body which was affected by the venous obstruction), chronic cyanosis, and splenic enlargement. The lesson taught by the case in question was confirmed by experiments on two animals to the satisfaction of Reckzeh; he found that compression of the superior vena cava caused sufficient stagnation of the blood current to induce the development of a moderate polycythemia (6,200,000).

A. N. Hall[1] suggests that the polycythemia may be a compensatory process—an attempt to make up the deficiency in oxygen-carrying capacity of the individual cells by an increase in the number of cells. Moreover, polycythemia and enlargement of the spleen has been observed in obstructive cardiac lesions. Thus, E. Weil[2] found red transformation of the bone-marrow (the normal fatty tissue having disappeared) in postmortem examinations on two children with congenital pulmonary stenosis and chronic cyanosis. As stated above, most writers contend that polycythemia and enlarged spleen is a condition which is not synonymous with chronic cyanosis due to chronic valvulitis.

It can be readily understood how an unequal distribution can show polycythemia on examining the peripheral blood. It is a recognized fact that local cyanosis from any cause calls forth an increase in the number of red cells. It would appear, therefore, that any condition accompanied with cyanosis should be capable of inducing polycythemia.

On the other hand, it has been claimed that polyglobulism is ascribable to an overproduction of erythrocytes as a primary

[1] Amer. Med., June 27, 1903.

[2] Compt.-rend. Soc. de biol., 1901.

change, and this view is supported by the necropsy findings of a case reported by Weber and Watson;[1] they had convincing evidence that an increased production of erythrocytes was taking place in the bone-marrow. These observers, then, are inclined to regard the changes in the bone-marrow as primary, or if not, strictly speaking, primary, as representing an excessive "vital reaction" to stimulating agents.

Weber and Watson account for the symptom-complex of the condition on the supposition that the osmotic tension of the blood of patients with extreme polycythemia is higher than that of ordinary blood. Bence[2] holds the syndrome to be primarily due to an overproduction of red cells; he argues that the qualitative change in the various anatomical elements of the blood point to increased erythroblastic activity of the bone-marrow. Widal, assuming tuberculosis of the spleen to be a uniform pathological finding, thinks the diminished function of that organ produces increased activity of the bone-marrow.

Türk believes it to be a primary affection of the bone-marrow. Rosengart[3] found evidence of hyperplasia of the leukocytic myeloid tissue, including mast cells, myelocytes, and erythroblasts, in the spleen and liver. In one case this observation led Türk[4] to suggest that the syndrome was dependent on hyperplasia of this erythroblastic myeloid tissue plus the histological changes noted in the liver and spleen by Rosengart, a condition analogous to the hyperplasia of leukocytic myeloid tissue in myelogenous leukemia.

These changes, however, have not been noted by other observers. A. V. Korauspi[5] argues that the deficiency of carbon dioxide in the blood demands an increased hemoglobin content, hence also a polycythemia to maintain the normal acidity of this tissue. Limbrea first pointed out that polyglobulism goes hand in hand with carbon monoxide poisoning. Julius Bence found experimentally that the inhalation of carbon monoxide decreased the erythrocyte

[1] International Clinics, 1905, vol. iv, 14th series, p. 47.
[2] Deut. med. Woch., 1906, xxxii, Nr. 37.
[3] Mitteil. aus den Grenzgeb. der Med. und Chir., 1903, iv. 495.
[4] Wien. med. Woch., 1902, Nr. 5, p. 226.
[5] Quoted by Bence, Deut. med. Woch., September 13, 1906.

count from 9,860,000 to 8,000,000 and a simultaneous, distinct falling off in the viscosity was noted. He regards the fact that the inhalation of carbon monoxide produces a rapid reduction of the erythrocytes in these cases as prima facie evidence that the polycythemia is the result of a diminished percentage of this gas in the circulating blood.

Among the earlier reports of cases, principally by French writers, tuberculosis of the spleen was noted. But cases of splenic tuberculosis have been known to occur without polycythemia and cyanosis. For example, Reckzeh reports a fatal instance of tuberculosis of this organ, as shown clearly by an autopsy in which the characteristic features of polycythemia and cyanosis failed to appear during the life of the patient. Türk also reports two of his own cases, and four additional cases from the literature, in which tuberculosis of the spleen was wanting. It is quite certain that whilst the association of splenic tuberculosis with polycythemia and cyanosis is sometimes met with, the latter may occur without the presence of the former.

My observations in Case I, reported below, lead me to the conviction that defective venous tonus plays an important role in the pathogenesis of the condition. The nervous phenomena are at times, at least, well-marked and peculiarly distressing, as shown by the history of one of the subjoined cases.

Case I.—A. W., female, single, aged twenty-five years; height, 5 feet 6 inches; weight, 198½ pounds; was referred to me by Dr. Finney, of Baltimore. First came under observation September 23, 1904. The family history showed Bright's disease among the mother's antecedents; also eczema, rheumatism, and cases of moderate obesity. The mother, however, is living and in vigorous health; the father is deceased, of organic heart disease complicated with chronic nephritis, at the age of forty-two years. One brother was a hemophiliac; otherwise the family history was unimportant.

The patient had not contracted any of the usual childish diseases except measles at twelve years of age, at which time she arrived at puberty. Later she suffered from colds in the head, with much catarrhal discharge. At seventeen years of age she had congestion

of the lungs, and her eyes had been bad for fifteen years. From the eleventh to the twenty-third year of age the patient experienced one or two attacks of nose-bleed each month. Menstruation was formerly painful, but not now; it is irregular, however, recurring every two or three months, and consisting of a dark-brown discharge. Patient has pursued active physical exercise and has dieted, with a view to reducing the bodily weight, but without results. Cyanosis, which had slowly increased, was first observed ten years since.

Miss W. has been inclined to rheumatism for eight years, and subject to severe headaches during the same period. For one year prior to her first visit (September 23, 1904) the headaches had improved, but the cyanosis had become worse; at the same time she also suffered from violent cramps in the legs and feet. At the date of her visit the mucous surfaces were somewhat less livid than the skin. For several years the patient has been timid, mentally distressed, and apprehensive to a degree. She complained of slight vertigo at intervals. The urine analysis proved negative, as a rule, in its results. On one occasion, however, a reaction for sugar was obtained, the percentage being less than one.

A blood examination on four different occasions gave the following average result: red cells ranged from 5,300,000 to 6,960,000. The hemoglobin value averaged 110 per cent., while the leukocytes varied from 13,600 to 20,000. The red cells are overburdened with hemoglobin; they stain about normally and are of natural size and form. The white cells show mostly polymorphonuclear elements.

Physical Examination. The patient is a well-developed female subject, with good musculature and prominent panniculus adiposus. The face is markedly cyanotic, presenting a livid-red appearance everywhere except around the mouth, chin, base of the ears, and a narrow border around both eyes, the latter areas looking blanched by contrast. Both cheeks and forehead show a far greater degree of cyanosis than the rubicund face of plethoric obesity. As in other cases reported, pressure upon the skin left a decided anemia, which slowly became effaced. Examination of the superficial veins of the face conveyed the impression that they were greatly lacking in tonicity. The apex beat is indefinable, owing to corpulency.

An examination of the lungs proved negative in its results. The heart shows slight enlargement of the left ventricle. It is difficult to delimit the organ, however, owing to the subcutaneous fat deposits. The first sound is somewhat muffled, the second aortic slightly accentuated, and the action of the heart is abnormally rapid, the pulse ranging from 110 to 120. There is no evidence of arteriosclerosis and the blood pressure tested by the Riva Rocci blood-pressure instrument—systolic 145, diastolic 115. The spleen is found to be slightly enlarged. The liver is of normal dimensions; also the thyroid gland. No other abnormal physical signs are discoverable.

The treatment was directed toward the reëstablishment of the menstrual function, and after eighteen months the menses occurred every six weeks. The patient has been seen at intervals of two or three months from the date of my first examination until the present, and the course of the complaint has been marked by recurring exacerbations and remissions. The headaches, however, have been practically absent for a year or longer, or since the menses have been more nearly normal; the distressing feeling of apprehension has also undergone noticeable improvement, particularly during the last six months, and the same is true of the cyanosis. At date of writing (January 20, 1907) the nervous tremor, mental apprehension, and the endurance show marked improvement. It is worthy of note that the nitrites afforded considerable temporary relief from the headaches from the beginning, thus showing that the cause of the headaches most probably was in part at least heightened tension in the cerebral vessels.

Case II.—A male, aged thirty-one years, a clerk; height, 5 feet 9 inches; weight, 125 pounds; came under my care June 7, 1904. The mother died of childbirth at forty-five years of age. The father is living and healthy. He has brothers and sisters, all of whom enjoy good health. The previous diseases from which the patient suffered were mumps, whooping-cough, and two attacks of influenza in adult life; he has also been susceptible to "colds" in the head and chest, which he ascribes to catarrh of the naso-pharynx.

The social history shows moderate indulgence in tobacco and alcohol, the free use of coffee, rarely tea, and the usual indifference to diet. There is no history of either gonorrhœa or syphilis. The patient is married and has three children, all healthy. He has complained of indigestion at intervals for the past fifteen years, the principal symptoms being fulness, eructation of gas, and discomfort in epigastrium, shortly after the ingestion of food; the bowels act regularly; the vision is blurred at times, and headaches, mental apprehension, and slight dizziness have been the chief nervous phenomena; for several years the patient has become easily fatigued on muscular exertion (asthenia); the legs are weak and also the grasp; he sleeps well; during the day he has considerable cough attended by mucoid expectoration and thoracic pains, which radiate to the lumbar regions.

The *physical examination* shows at a glance cyanotic lips, conjunctivæ, ears, and face (especially the nose); the hands and feet are also quite dusky. This cyanosis had been present for five years. The left ventricle is somewhat enlarged (hypertrophied), a faint systolic murmur is heard at the apex, and the second pulmonary sound is moderately accentuated. The spleen is palpable, but not markedly enlarged. The pulse is somewhat accelerated, but the tension is not abnormally high. The urine contained no albumin. A blood examination by Dr. Batroff showed: red cells, 7,400,000; leukocytes, 12,600; hemoglobin, 130 per cent.; color index, 0.88 per cent. The differential count gave this result: polymorphonuclear leukocytes, 69.30; small lymphocytes, 23.72; large lymphocytes, 6.5; eosinophiles, 0.5 per cent.; absence of poikilocytes, macrocytes, microcytes, and nucleated red cells. The red cells were of uniform diameter, and contour was perfectly preserved; no crenation or other abnormality, and the staining capacity exceedingly good.

The patient has been seen at long intervals until the present time. The principal complaint at these visits was nervous apprehension, momentary dizziness, and disinclination for exertion, either mental or physical. As the result of treatment, chiefly dietetic, the digestive function has been improved, but the cyanosis and nervous phenomena have been only slightly relieved, if at all. Small

doses of cardiac stimulants, such as digitalis and strychnine, seemed to afford relief from the cyanosis and increase the general strength, but only temporarily. The nitrites also failed to bring about lasting improvement, although affording some degree of relief from the cerebral symptoms.

Case III.—A third case, in which the diagnosis may be questioned on some accounts, came under my notice September 23, 1904, through the kindness of Dr. Prickitt, of Mt. Holly. The history is as follows:

E. A., aged twenty-one years; single; height 5 feet 3 inches; weight, 86 pounds. The father is deceased, from necrosis of the leg following an operation; the mother lives and is healthy; has two brothers and two sisters who enjoy good health. Apart from neuropathic heredity on the mother's side, the family history is of no etiological importance.

Patient experienced the usual childish diseases, and at twelve years of age developed chills, accompanied with fever and sweats, (presumably malaria), lasting several weeks. Later, or when seventeen years of age, was operated on for appendicitis (primary attack); at the age of nineteen years received a blow by a hard ball over the right ovary. This was followed by inflammation and three abscesses which ruptured into the uterus; cystitis followed, and two years later, May, 1905, curettement was performed; subsequently acute nephritis developed. The menstruation began at eleven years, has been somewhat painful, and since the operation for appendicitis has shown a markedly irregular tendency.

The present illness dates from the operation for appendicitis, four years ago, although no cyanosis developed until after the curettement in May, 1905. The urine is scanty, dark, alkaline in reaction, and slightly albuminous; no casts are present. Physical exertion increases the cyanosis and induces dyspnœa. The patient is weak and neurasthenic.

The skin is markedly livid, especially that of the face, and there is obvious inspiratory dyspnœa; the pulse is rapid, small, and compressible, and the heart slightly dilated, and an occasional systolic murmur is audible at the tricuspid orifice. The abdominal walls

are tense and hard to the touch; no splenic enlargement is detectable, and there is no œdema of the lower extremities.

The blood examination by L. N. Boston shows a cyanosed condition of this tissue; blood flow from puncture free; hemoglobin, 120 per cent.; erythrocytes, 4,290,000; leukocytes, 11,100. The stained specimen reveals many poikilocytes, a few macrocytes, and some nucleated red cells; all cells overstained and very deeply. A subsequent blood examination (made by W. C. Batroff) gave a somewhat different result: the blood flows freely from puncture, and resembles chocolate in appearance; the hemoglobin value from a cyanosed finger, 79 per cent.; from a cyanosed ear, 110 per cent.; red cells, 4,800,000; white cells, 8400; differential count of leukocytes shows: polymorphonuclear, 67 per cent.; small lymphocytes, 24 per cent.; large lymphocytes, 7 per cent.; eosinophiles, 1 per cent.; mast cells, 1 per cent. The corpuscles are generally large, with decoloration of the centres; a few poikilocytes, few macrocytes, but no erythroblasts were found.

In this case the structure of the blood is somewhat abnormal, and while the color index shows no anemia present, but rather the reverse, the red-cell count (4,290,000 to 4,800,000) is comparatively low, and there are abnormalities in form and size of the corpuscles. It scarcely seems tenable to suppose that the principal difficulty in this case consists in deficient oxidation, owing to the absence of an increase of the red corpuscles, to account for the excessive hemoglobin content of the erythrocytes. A tabular record of my own and all the cases not included in Reckzeh's will be found in the table on the opposite page.

Remarks. My own figures coupled with those of Reckzeh (not included in my tables) give a grand total of 53 cases. These will form the subject of a few observations and inferences.

Sex. According to most writers, males are more prone to the affection than females, but of the 18 cases that I have collected, in which the sex is given, 11 (or 61 per cent.) were in females, and 7 (or 39 per cent.) were in males. Engelbach and Brown state that an "analysis of all the cases shows it to be about equally divided between the sexes."

TABLE I.

Case	Author.	Sex, age	Splenic enlarg.	Albuminuria.	Hemorrhage.	Result.	Remarks.
1	Weber	F. 37	Yes	No	No	Improved	Absence of cyanosis.
2	Zimlick	M. 32	...	No	No	Died	
3	Collins	F. 24	...	No	No		
4	Hall	F. 61	No	0.05%			
5	Hall	F. 40	No				
6	Weber and Watson	M. 58	Yes	0.5%	Hematemesis (?) 5 yrs. ago	Died	Cause of death, syncope.
7	Engelbach and Brown	F. 40	Yes	Trace	No	No change	Duration 11 yrs.
8	Bence	M. 43	Yes	1%	No	"	No apparent obstruction after 5 yrs., but 9 yrs. cyanosis.
9	Bence	F. 45	Yes	No	....	"	Short period. Began 2 yrs. ago.
10	Bence	F. 42	Yes	No	....	"	Began 2 yrs. ago from gums bleeding.
11	Koranyi[1]						
12	Hutchinson and Miller	M. 45	Yes	Trace	Yes	Died	Died of coma and hyperpyrexia. Duration 7 yrs. 2 mos.
13	Begg and Bullmore	F. 47	Yes	No	....	Improved	
14	Lommel	M. 42	Yes				
15	Robertson	M. 48	Yes	0.7%	Yes	....	Obstinate constipation.
16	Aldrich and Crummer	F. 53	Yes	No	No		
17	Reissmann	F. 18	No	...	Yes	....	Signs of venous obstruction in chest and legs.
18	Anders	F. 25	Yes	None	Yes	Improved	
19	Anders	M. 31	Yes	...	....	....	Began 10 yrs. ago.

Race. Of 7 cases reported by Türk, 5 occurred in Hebrews, and racial predisposition is generally conceded. Precise figures to indicate the influence of race, however, are wanting.

Age. According to Reckzeh, the great majority of the cases occur in the middle period of life. On the other hand, Türk's figures (based on a total of 20 cases) show that it occurs principally in adults. In my group of 18 instances the age was recorded, and of these 3 occurred between twenty and thirty, 3 between thirty and forty, 9 between forty and fifty, and only 3 after fifty years of age. My results, therefore, are in consonance with Reckzeh's, rather than with those of Türk.

Spleen. Reckzeh has pointed out that in only 2 (Osler, Cabot) out of 34 cases was there an absence of splenic enlargement. Of the 18 cases recorded in my table, splenic tumor occurred in 14, or 78 per cent. It was present in 44 out of a total of 49 cases collected from various sources by me, or in 89.8 per cent.

[1] No details. Case referred to by Dr. Bence. Treated with oxygen inhalations.

TABLE II.—BLOOD EXAMINATIONS.

Author.	Erythrocytes.	Size and form.	Normoblasts.	Polychromatophiles.	Leukocytes.	Lymphocytes.	Leukocytes mononuclear and transitional	Polymorphonuclear.	Eosinophiles.	Mast cells.	Myelocytes.	Hemoglobin. %
Bence, Case I	10,340,000 9,440,000	Practically normal	1 1	None "	12,500 6,400	9.2 12.3	1.7 mono. ..	80.0 78.6	6.7 4.6	3.1	...	180 (Gowers)
Bence, Case II	8,000,000	....	..	..	....	....	..	....	....	....	...	27.2
Bence, Case III	8,350.000	....	..	..	8,400	....	..	....	....	....	...	27.8
Engelbach and Brown	10,909,000	....	..	..	9,600 (9 to 11%)	....	5.0 mono.	....	....	....	...	above 120
	8,037,000	....	..	Few	6,600	11.0 to 14.0	6.0 trans.	75.0 to 76.0	1.0 to 1.5	not increased		
	12,584,000	....	..		9,600							
Zimlich	6,480,000	....	..	..	13,200	12.0	5.0	85.0	2.5	....	...	120+
	9,240.000	....	..	..	....							120+
Ascoli	?	....	..	..	15,000	16.0	11 0	51.0	20.0	2.0	...	95, was 110
Weber	8,240,000	....	..	..	4,000	17.25	8.5	66.8	0.5	1.0	...	120
	10,960,000	....	..	..	9,000			81.0				185
Hall, Case I	9,949,600	Normal	..	..	6,500	....	..	....	....	....	...	170 200
Hall, Case II	9,935,000	....	..	..	22,000	....	..	....	....	....	...	160-170
Collins	9,821,000	Normal	..	..	17,800	26.0	..	73.0	0.5	....	None	110
Weber and Watson	10,000,000	Practically normal	..	..	7,500	17.4	..	82.4	0.2	....	None	170
	11,000,000		..	..	8,000							
Koranyi {quoted by Bence}	7,400,000											
Hutchinson and Miller	8,000,000	Nothing abnormal	..	..	....	5 6	2.4	82.8	2.8	2.4	...	110
	11,000,000		..	..	17,160							120
Begg and Bullmore	6,850,000	....	..	..	11,300	13.8	4.0	77.3	1.5	....	...	100
Lommell	8,230,000	....	..	None	11,000							
Aldrich and Crummer	7,700,000	Variation in size and contour	..	..	4,700	19.0	..	72.5	4.0	....	4.5	120
	6,648,000		..	..	5,500							90
Anders, Case I	5,300,000	Natural, overburdened with hemoglobin	..	..	22,000	38.05	.	61.9	0.5	....	...	110
	5,960,000		..	..	1,320,000							110
Anders, Case II	7,100,000	Normal	..	..	12,600	29.77	..	69.3	0.5	....	...	130 color index 0.88%

Albuminuria. This was present in 43 per cent. of the cases in my series in which the symptom had been investigated. Engelbach and Brown state that albuminuria occurs in one-half of the cases, in some in large amounts.

The most characteristic blood-finding is polycythemia. It has been held by certain writers that an erythrocyte count of less than 8,000,000 does not constitute polycythemia with enlargement of the spleen. On the other hand, Cabot holds that the red cells number about 7,000,000 in a typical case. Unquestionably, cases which presented every other characteristic clinical feature have been reported in which the erythrocyte count was below these figures. In Case III of my series (not included in my table) the erythrocyte count was only slightly above normal, if we regard 4,500,000 as the normal standard in the female. In the majority of instances, however, the red cells number over 8,000,000, as may be seen from a glance at Table II.

In most cases of polycythemia a moderate leukocytosis is present, although a few have been reported in which a leukopenia was found.

Cases have been reported in which the leukocyte count fell short of that of the erythrocytes. Thus in a case recorded by Osler only 4000 leukocytes per c.mm. were noted, while the red cells numbered 9,953,000; hemoglobin, 120 per cent. On the other hand, we see in certain reported cases an increase of the leukocytes out of ratio to the erythrocyte count. For example, in some cases in which the red cells did not exceed 7,000,000, the white cells amounted to over 20,000. The cases just related belong to this category. I mention these facts with a view to emphasizing the point that mere obstruction to the circulation, or blood stasis, does not account for this symptomatic manifestation.

Of 18 cases in which the leukocyte count is given in my table, 14 showed an increased number of leukocytes. Attention has been directed to a disproportionate increase in the polymorphonuclear leukocytes as an evidence of primary disturbance of the blood-forming organs. This finding, however, did not obtain in my 2 cases, and the table indicates the following in this respect: 7 cases in which

the polymorphonuclear elements were relatively increased, and 7 cases giving a ratio at or below the normal. It would seem that the normal proportion of the different forms of white cells is maintained, as shown by the differential count, in about one-half of the cases at least. Analyzed with regard to the hemoglobin percentage, an examination of Table II will show that of 16 cases in which this percentage is reported 10 are above 120 per cent., 1 shows only 90 per cent., and another 100 per cent. In 1 of Hall's cases the hemoglobin value was 200 per cent.

Is the abnormal blood-forming power a physiological or a pathological process? It is clear that on account of the increase in the value of the various elements of the blood, which increase is usually more or less proportional, the blood-generating organs are stimulated, but the question arises, Is this a primary or a secondary role? Vaquez was the first to suggest that primary tuberculosis of the spleen was the cause of the syndrome. Bence, Widal, Türk, Osler, Rosengart, and Weber and Watson, previously named, all contend for a form of polycythemia with splenic enlargement, either of unknown etiology (Osler) or due to splenic tuberculosis or to a primary overproduction of erythrocytes from some stimulating agency not as yet discovered. As pointed out by Engelbach and Brown, and others, however, many cases have more recently come to autopsy, in which neither the spleen nor any other organs showed tuberculous lesions; hence this morbid process cannot be held responsible for all cases. In my cases and in many reported by other observers the blood examination failed to show changes in this tissue of sufficient importance to justify the inference that the blood-making organs are directly affected. W. Egbert Robertson informs me that in his case (Table I) no primary disease of the hematopoietic organs was indicated by the microscopic findings, the blood having been, on one occasion, taken from the spleen notwithstanding.

At present the balance of testimony is clearly in favor of the view that in many cases described as polycythemia and cyanosis with splenic enlargement, the extraordinary blood-making power, as shown by the increased number of red cells in the bone-marrow, is

probably secondary or physiological and quite analogous to what is sometimes seen after excessive hemorrhage.

In this connection certain well-established effects of venous hyperemia, due to some form of obstruction, should be briefly presented. In the first place, the velocity of the blood current is decreased in stasis, and although more than the usual number of corpuscles occupy the capillaries and veins, the temperature is low as compared with that of a part or parts of the body the seat of arterial congestion. As venous congestion advances with slow increase in the size of the veins and capillaries, the metabolic processes are profoundly affected and lowered, rendering the tissues abnormally susceptible to the influence of microbic and all other forms of irritants.

The cyanotic induration of the various viscera (liver, spleen, kidney) in consequence of continuous venous hyperemia is well known. Here the supporting structure of the organs is strengthened by the formation of fibrous tissue. Now, it is reasonable to suppose that analogous changes occur in the nervous structures, parts of the brain, spinal cord, ganglia, and nerve shafts that are endowed with connective tissue. We may assume that all tissues which are the seat of prolonged venous engorgement present pathological changes which are far-reaching and variable in character. The query here arises, Can we ascribe the nervous phenomena observed in chronic polycythemia and cyanosis with enlarged spleen to the effects of the venous obstruction? It is a matter of common observation that in chronic valvulitis the principal nervous features arise after failure of compensation, or at a time when engorgement of the veins is present. When the left ventricle fails to maintain the movement of the blood in the capillaries (*e. g.*, in aortic incompetency), insomnia, headache, vertigo, restlessness, and weariness are observed. Again, emotion may induce palpitation. These symptoms all have their parallel in cases of chronic polycythemia with cyanosis, and the same is even more true of that prominent symptom, dyspnea on muscular exertion. The comparison also holds, although less completely, with reference to the general neurasthenic symptoms.

In cases of true polycythemia and cyanosis with enlarged spleen

there is a painful nervous apprehension, such as is witnessed in functional diseases of the heart arising from conditions outside of this organ. Every clinician of wide experience, however, must have met with structural affections of the heart in which the nervous equilibrium is more or less disturbed by this class of phenomena, *e. g.*, when the heart muscle is hyperesthetic from exhaustion.

The symptomatology of the condition, so far as observed, may be accounted for, in great part at least, by the persistent cyanosis, and the polycythemia may be looked upon as a result of the venous stasis; and this hyperglobulism is intended to compensate for the diminished oxygen-carrying capacity of the blood.

As stated above, however, true polycythemia and cyanosis with enlargement of the spleen, according to the majority of writers, exhibits a wider range of symptoms, as a rule, the nervous phenomena being especially conspicuous in the clinical picture, and the blood findings recorded in some cases, it has been justly claimed, are at variance with those found in mere stagnation.

It may be argued that if stagnation alone were the cause, the syndrome would probably show greater prevalence than it has done. Again, the cases would naturally subdivide themselves into local and general polycythemia according to the character and location of the vessels. I regard it as probable that there is a form of primary polycythemia of unknown etiology, characterized principally by marked polyglobulism and other hemic features, cyanosis, headache, vertigo, and splenic enlargement; but it must be of rare occurrence, while it is clear that the majority of the cases which have been reported and classed as instances of this condition have had a different pathological etiology, although closely simulating the primary variety clinically. Finally, further proof, both clinical and pathological, is required before any of the theories thus far advanced can be accepted.

Treatment. As regards treatment, it may be said that no special methods thus far advanced have been accepted as generally applicable. The environment is to be made as favorable as possible, physically and mentally. A light, nutritious diet, an abundance of fresh air and gentle methodical exercise, should be advised and

encouraged. Of medicines, the nitrites have been most extensively employed, and they have afforded relief to the headache and other cerebral symptoms, in some cases at least. As stated by Watson, venesection, with or without the injection of saline, has been followed only by temporary effects. Begg met with a case, presumably of malarial origin, in which the vigorous treatment adopted in the East in such instances was resorted to, viz., the tri-iodide of mercury ointment was applied over the spleen, and the part exposed to artificial heat, while quinine was given in increasing doses up to 45 grains a day. As the result of this treatment, the few pathological elements shown by the blood examination progressively diminished; the spleen, which was enlarged, retracted upward two inches in the mammary line. That the principal benefit in Begg's case arose from the massive doses of quinine was shown by the fact that the temporary discontinuance of the remedy was followed by an increase in the size of the spleen. The results obtained in this case also point to a possible malarial origin of chronic polycythemia and cyanosis with enlarged spleen, in some instances at least. If this view be accepted, it is obvious that the blood changes presented by the syndrome in such cases are to be classified as secondary.

The viscosity of the blood is greatly increased in this condition, as shown by Weber and Watson; hence, on rational grounds, the use of iodides should be advised. In my cases, however, their exhibition was without obvious beneficial effects. In Case I of my series, in which amenorrhea and moderate obesity were present, improvement was noted on the reëstablishment of the function of menstruation.

DISCUSSION.

Dr. G. E. de Schweinitz: I think it may be interesting to say a word or two in regard to the ocular conditions which surround the disease described by Dr. Anders and to exhibit this colored drawing published by Dr. Uthoff representing the ophthalmoscopic appearances of a patient suffering from polycythemia. The blood count revealed about 10,000,000 red cells, the white cells were practically normal, and there was elevation of the hemoglobin percentage. It will be noticed that the most conspicuous ophthalmoscopic feature is the enlargement and tortuosity of the retinal veins and that their enlargement is not an even one, as they are swollen in some places and narrowed in others, very much as one sees them in certain types of arteriosclerosis, where the hardened retinal arteries press upon the non-resisting veins. The arteries in this case are a little wider than normal and slightly darker in color. Otherwise there are no changes in the eye-ground; that is to say, there are no hemorrhages, white spots, or exudates. This condition obtained in both eyes. An interesting observation made by Koester in another case, in addition to venous hyperemia of the eye-ground, was a periodic obscuration of the visual field, which in the one eye continued for several hours, and which Koester attributed to circulation disturbances in the retina itself. In addition to this there was typical ophthalmic migraine. I have had the opportunity of examining two cases of suspected polycythemia, finding also very great enlargement of the retinal veins, but no other changes. In neither of these cases, however, were all of the requirements of the syndrome described by Dr. Anders present, and therefore they were not published or recorded as true instances of this affection.

Dr. Anders (closes): I tried repeatedly to have these patients consult an oculist, but thus far have been unable to persuade them to do so. I am aware that the eye-grounds often present very interesting changes. It is gratifying to learn that the condition of the retinal vessels described by Dr. de Schweinitz is strongly corroborative of the statement which I made concerning the lack of venous tonus in this disease.

INFECTIONS WITHIN THE THORAX—EMPYEMA.[1]

By JOHN H. MUSSER, M.D.

In the University Hospital I have found that 9 in 489 cases of pneumonia, or 1.8 per cent. of all cases of pneumonia, were followed by empyema. From the literature I have collected 12,892 cases, 276 or 2.1 per cent. of which had empyema. These figures are based upon clinical reports. Based upon autopsy, empyema was present in 5.1 per cent. of 973 cases of pneumonia. These figures illustrate the frequency of this complication in the disease.

My object in bringing forward the subject is to call attention to some points in the early recognition of empyema and to suggest that attempts be made to recognize, and to resort to operative procedure early. It is not much credit to the physician to send a patient with a chest full of pus to the surgeon.

The diagnosis must be made in part from a full understanding of the antecedents of the infection. Just as with peritonitis, there is no doubt that empyema does not occur idiopathically. This antecedent condition is pneumonia in a large majority of cases. The pneumonia is almost always attended by a serous pleurisy, and frequently serous pleurisy is followed by empyema. A serous pleurisy may be due to other than the pneumococcus organism. The streptococcus is the most common and the tubercle bacillus the next. Typhoid fever and scarlet fever are two of the other fairly common antecedents of empyema. It follows local conditions such as disease of the rib, the subpectoral tissues, the esophagus, and disease below the diaphragm.

We have chiefly, in the recognition of the small empyemas, to

[1] Read February 6, 1907.

remember the relationship between pneumonia or other infections and this secondary infection and, therefore, to be on our guard if the development of the general phenomena of infection after the pneumonic or other infections process has apparently subsided occurs. Sometimes local infection of the pleura may develop coincidentally with the crisis and the characteristic phenomena of localized pus occur, such as intermittent fever, chills, and sweats. A leukocytosis which persists after the crisis associated with the general phenomena of infection is one feature of great significance in this instance. Great stress must be laid upon the presence of a rise of the leukocytes after the normal fall at the period of crisis of pneumonia. Hence, the pleural infection may develop before the crisis with persistence of leukocytosis; it may develop gradually after the crisis, or may occur suddenly after the crisis, the leukocytosis rising after the critical fall. If sudden, usually there is a mixed infection and generally that of the streptococcus and pneumococcus.

Sufficient attention has not been paid to the significance of what might be considered minor local symptoms in the course of the convalescence of pneumonia and the early period of a beginning empyema. Pain is one which need not be severe and not of the type seen in acute pleuritis, but the persistence of steady pain, however, especially in certain localities, leads us to suspect the possibility of empyema developing. It certainly leads us to recognize the location of the empyema. More significant is the localized tenderness, first, as an indication of the development of abscess, and, second, as an indication of the location of the abscess. The pain elicited by pressure of the finger is at first deeply seated and requires pretty firm pressure, afterward becoming more and more superficial. As is generally pointed out in the discussion of the physical signs this localized tenderness is in certain definite localities.

In addition to the general symptoms and the small localized signs suggestive of the presence of pus, of a localized abscess, we have the results of the physical examination next to support us. Not the physical signs of pleural effusion or of even a moderate collec-

tion of fluid, but the physical signs indicating that there is impairment of the expansion of the lung of the affected side and the presence of localized pleuritis. We must seek for the latter signs, not particularly in the classical regions that we are taught to look for pleural frictions, but along the divisions of the lobes and at the extreme base.

Of great importance is localized friction. After the subsidence of pneumonia the occurrence of friction with pain and tenderness may be the only physical signs for some little time. These frictions are very good guides as to the position of the abscess when it is between the lobes and under the diaphragm. When between the lobes the frictions are along the septa. I have found them in the anterior axillary line either on the left side or right, when the abscess may be two or three inches above between the septa, and practically almost near to the root of the lung.

The physical signs of impaired expansion are determined by inspection, palpation, percussion, and the occurrence of the Litten phenomena. Little if any reliance can be placed upon the fremitus, as it is variable. If the abscess is diaphragmatic the change of percussion note begins below and extends upward. Frequently the abscess is primarily interlobar. At points corresponding on the surface of the chest to the fissures the changed note extends along their course, but generally anteriorly it is below, laterally opposite, and posteriorly below the line of division, the interlobar pus by its weight sagging in these deviations.

At first the note is hyperresonant or skodaic. After three or four days the quality of the resonance changes to impaired and then dulness, depending upon the rapidity with which the abscess increases in size. It is surprising how long the abscess may remain localized and of moderately small area. By this time the voice sounds are not usually different from those we find in the occurrence of small effusion.

The *x*-ray is of some value in recognition of the presence of an abscess. When small abscesses are present one is only able to see that a well-defined shadow is present. We cannot, of course, make a diagnosis of abscess within the pleura, and can only state

that there is a consolidation or effusion by the difference in the density.

When we have put together the occurrence of antecedents, well-defined local symptoms, and the physical signs we are well up to the point of determining upon the last, the final, and crucial method of diagnosis. I am thoroughly convinced that, under the circumstances that I have mentioned, we are not doing our duty to our patient or to ourselves if we do not seek the advice of a surgeon and ask from him an exploratory operation. That such is expedient I am convinced from the number of cases that I have seen in which such exploratory operations are done without harm to the patient. I mean by exploratory operation not the mere cutting down upon the pleura, but resection of the rib. I have regretted more frequently that exploratory operation was not done than that I had resorted to it. I urge it too because in most instances, just as in exploratory operations of the abdomen, it is more free from danger than exploration with a needle or trocar. Against the use of the needle, I might say that it is almost impossible to localize the abscess to such an extreme degree of fineness as to direct the needle right to that point. We have had too sad an experience with failure with the exploratory needle. It is too important a matter with which to take any chances.

The surgical procedure is followed by rapid and perfect convalescence, without the long period of drainage ensuing, without the danger of secondary infection nor the risk to the general health of the patient, in the development of amyloid disease, Bright's disease, myocarditis, etc. For these reasons I urge the importance of the early recognition of small abscesses within the thorax, and their speedy detection and immediate cure by early exploratory operation.

DISCUSSION.

Dr. F. P. Henry: I agree fully with what Dr. Musser has said regarding the importance of early diagnosis in these conditions, and appreciate the points he has emphasized with the view of rendering that diagnosis more positive.

Dr. Judson Daland: It occurred to me, while Dr. Musser was speaking of the well-known danger of a dry tap, leading to the conclusion that no pus is present, that many of these peculiar conditions justify the use of the exploring needle, with the full understanding that a dry tap *does not* necessarily indicate that no pus is present. I would feel justified, therefore, in using the needle, with the full understanding that a dry tap does not carry with it, necessarily, the conclusion that no pus is present. If pus is obtained, the small amount removed does not interfere with the surgeon's work.

Dr. Arthur V. Meigs: I have found the diagnosis of empyema very difficult. This is particularly the case if the empyema is small. I have been unable so successfully to localize pus in the pleura as Dr. Musser appears to think can be done. I have sometimes had the chest opened and no pus was found until the finger of the operator broke into the cavity. The diagnosis is usually well made by physicians as by surgeons, and I think it is difficult to find a surgeon who will lead a careful physician in regard to the discovery of pus in the pleura at an early stage of the disease.

Dr. R. G. Le Conte: I think that the criticism of the last speaker is perhaps just. The surgeon is not a wizard, and when he sees a patient for a few minutes he cannot always localize pus which the attending physician has been unable to do after repeated examinations.

I have had the experience of once opening a chest where I did not find pus. This was at the Children's Hospital with my colleague, Dr. Frederick A. Packard. With a small needle he had withdrawn two or three drams of pus. I operated the same day at the site of puncture, and did not find any pus. An uninterrupted recovery followed without further evidences of suppuration.

Dr. S. Solis Cohen: I can only endorse, heartily, the advice given in the paper to open the chest fearlessly even when a dry tap has been made, provided the symptoms and physical signs lead one to believe that pus is present. I recall one case in which I had made three unsuccessful exploratory punctures, and even after opening at the point indicated by me the surgeon was not able at first to find fluid, but very dense adhesions were present which, upon rupture, revealed a pus cavity. I recall also a case which one of my pupils brought to me in consultation, after unsuccessful tapping, and I concurred in his advice to open for pus. Under anesthesia and after incision, a needle was inserted without difficulty, but pus did not appear. We were still so convinced of the diagnosis that a rib was resected when pus was found too tough to run through

the cannula. Such experiences must be quite common with all clinicians and all surgeons.

Dr. A. A. Eshner: I merely want to add, on the basis of personal experience, that I think in any case in which there have been signs of pleural effusion, even in cases in which, on repeated attempts, fluid has been obtained, and a "dry tap" has resulted and the symptoms persist, exploratory resection of rib is entirely justifiable. In a large number of instances pus will be found in large or small amounts.

Dr. Musser speaks of "exploratory procedure" and of the result as a "permanent recovery." While these terms appear to be somewhat contradictory, the results justify their employment. In a good many instances, in which the procedure is undertaken, the introduction of the finger or blunt instrument will disclose a large or small accumulation of pus, which, with proper drainage, will disappear, with the ultimate recovery of the patient.

CONCERNING PULSATING EXOPHTHALMOS.[1]

By G. E. de SCHWEINITZ, M.D., and T. B. HOLLOWAY, M.D.

From 1805, when Travers recorded the first case of pulsating exophthalmos to which reference is usually made, until the present time, 313 cases of this affection have been placed on record, and a number of analyses of the literature have been prepared, beginning with Sattler's collection, in which 106 cases are classified, based upon the records to the middle of 1880. Since that date several papers and monographs have been published containing extensive bibliographies, for example, those by W. Adams Frost,[2] Koehler,[3] Nieden,[4] Le Fort,[5] de Schweinitz,[6] Keller,[7] Reuchlin,[8] Slomann,[9] Houillon,[10] and Lagrange.[11]

The object of the present communication is: (1) To analyze those cases not previously recorded in the tabular statements already referred to, 69 in number; (2) to elaborate and compare the therapeutic measures, surgical and otherwise, which have been employed in the treatment of these cases; and (3) to endeavor to arrive from these analyses at that surgical procedure which seems likely to prove of the greatest advantage in the control of the symptoms of this disease.

[1] Read November 6, 1907.

[2] Trans. of the Ophthal. Soc. U. K., 1883, iii, p. 15.

[3] Deutsch. Militärische Zeitschr., 1886.

[4] Archiv f. Augenheilk., 1886-87, xvii, pp. 285–287.

[5] Revue de Chirurg., 1890, x, p. 481.

[6] International Medical Magazine, February, 1895.

[7] Beiträge zur Casuistik des Exophthalmus Pulsans, Inaug. Dissert., Zurich, 1898.

[8] Zur Casuistik des doppelseitigen pulsierenden Exophthalmus, Inaug. Dissert., Tübingen, 1902.

[9] Jahresbericht f. Ophthal., 1898.

[10] Considérations à propos de deux cas d'Exophthalmos Pulsatile, Thèse, Nancy, 1893.

[11] Traité Tumeur de l'Oeil de l'Orbit et des Annexes, vol. ii, pp. 261–315.

To follow strictly the contention of Keller, who, after Sattler and Slomann, has written the most complete monograph on this subject, the term "pulsating exophthalmos" should be strictly limited to that disease in which a communication of the internal carotid with the cavernous sinus has been demonstrated, or is reasonably certain.

It must be remembered, however, that although the most frequent intracranial cause of this disease depends upon the condition just described, in a certain number of cases aneurysm of the internal carotid and aneurysm of the ophthalmic artery, as, indeed, Keller himself points out, are interpreted by the cardinal symptoms of this affection—exophthalmos, pulsation, and bruit. So, too, tumors of the brain which have broken into the orbit, as well as tumors of the orbit itself, or protruding into it from neighboring sinuses, can cause symptoms which are analogous to those furnished by typical pulsating exophthalmos, although a careful study should, in most instances, be rewarded by the establishment of a safe differential diagnosis.

It will be remembered that in early days pulsating exophthalmos, sometimes called "aneurysmal proptosis," or "vascular protrusion," was attributed solely to aneurysm of the orbit, although the writers were not quite sure whether the lesion was a true aneurysm, an aneurysm by anastomosis, or aneurysmal dilatation of the ophthalmic artery in its whole course. Nélaton and Rivington first satisfactorily demonstrated that exophthalmos, pulsation, and bruit may be due to an extra-orbital aneurysm of the ophthalmic artery, to an aneurysm of the internal carotid, and to an aneurysmal varix involving the internal carotid and cavernous sinus, and, as we know, the last-named lesion, namely, arteriovenous communication, is the one most frequently responsible for this phenomenon, and the one which Keller insists should alone be held responsible for it, in so far as the intracranial cases are concerned.

Number of Cases and Causes. For the purpose of the present analysis, our tables contain 69 cases which may be strictly regarded as representatives of pulsating exophthalmos, and 11 doubtful or atypical cases, making a total of 80 cases. Excluding these 11

doubtful cases, we deal only with the 69 first mentioned. Of these, 54 were traumatic in origin, 13 spontaneous, 1 occurred as the result of a tumor, and in 1 the exciting cause is not stated. Of the traumatic cases, 54 in number, 20 were due to falls with associated head injury, 17 to blows on the head, 4 either to blows or falls, 6 to gunshot wounds, and 7 to punctured or penetrating wounds. The right eye was affected in 31 and the left eye in 26 of the cases; in 5, which of the eyes was involved is not mentioned. Seven cases were bilateral, 5 traumatic, and 2 spontaneous in origin.

Age and Sex. Among the 54 traumatic cases there were 31 males, 16 females, and 7 with the sex not stated. The average age at which the affection developed among the 44 cases in which the year of life is given is 30.6 years. In the first decade there were 3 males, in the second 3, in the third 7, in the fourth 5, in the fifth 6, and in the sixth 2. In corresponding decades there were, respectively, 3, 2, 4, 0, 3, and 4 females. The youngest patient in the series was four years of age (Usher) and the oldest fifty-eight years of age (Ridley).

Among the 13 spontaneous cases there were 5 males and 8 females. The average age at which the affection developed among the 11 cases in which the year of life is given is 42.7 years. In the first decade there was 1 male, in the second none, in the third none, in the fourth 1, in the fifth none, in the sixth 2, in the seventh none, and in the eighth none. In corresponding decades there were, respectively, of females, 0, 0, 2, 3, 0, 0, 1, 1. The youngest patient in this series was sixteen months (de Bruin), and the oldest patient eighty years (Cantollet and Cerise). The age of the patient with tumor was twenty-two. The oldest patient in the entire series was eighty-one years (Brandes); the cause, that is to say, whether traumatic or spontaneous, is not stated.

Symptoms. These naturally separate themselves into those which pertain directly to the eye and its movements and those which find their expression in other portions of the cranium.

First, as to *vision*, and for this purpose it is convenient to speak of eyes and not of cases: The acuity of vision, and this refers to the last recorded acuity of vision, of 19 eyes is not stated; 13 of these

belong to the traumatic, 5 to the spontaneous, and 1 to the "cause not stated" series. Of the remainder, 10 eyes (7 of the traumatic and 3 of the spontaneous series) were blind; 5 eyes (5 of the traumatic and none of the spontaneous series) had light perception only, or, at most, counted fingers; 11 eyes (9 of the traumatic and 2 of the spontaneous series) had a reduction of vision greater than one-half; 18 eyes (14 of the traumatic, 3 of the spontaneous, and 1 of the tumor series) had a reduction of vision less than one-half; while 13 eyes (11 of the traumatic and 2 of the spontaneous series) retained normal vision. In 2 patients the eye on the opposite side of the pulsating exophthalmos became blind (Pincus, Van Duyse), while in 1 case the right eye was enucleated and the left eye subsequently acquired pulsating exophthalmos (Wiemuth).

1. *Corneal Complications.* Among these are 4 cases of neuroparalytic keratitis and 4 of ulceration of the cornea, 3 of which developed after operative interference. Other corneal lesions which have been recorded are vascularization of this membrane, infiltration, slight opacity, general haze, temporary haziness, and striped keratitis. In 2 cases the cornea of the eye which did not exhibit pulsating exophthalmos was involved; in one instance in the form of a neuroparalytic keratitis requiring enucleation, and in the other in the form of a serpiginous ulcer. In 2 of the recorded cases iritis was present. Hyperemia of the iris was noted in a number of instances.

Muscles. Naturally, disturbances of ocular motility are prominent symptoms in this disease. In 5 instances there was complete external ophthalmoplegia, and in 6 complete immobility of the globe. From the descriptions it is not possible to state with accuracy whether this immobility depended upon paralysis of the external ocular muscles or upon immobility dependent upon surrounding orbital conditions. Exclusive of a complete external ophthalmoplegia, which would necessarily imply involvement of the third or oculomotor nerve, a special involvement of this nerve is recorded six times.

By far the most frequent muscle to be involved is the external rectus, and, therefore, the abducens nerve, and a paresis or par-

alysis of the abducens is noted in 17 cases (19 eyes), in 3 of which it was bilateral. In 6 cases there is no accurate differentiation of the muscle affected, but there was a diplopia, and in 3 of these cases the character of the diplopia was such that the third or oculomotor nerve must have been paralyzed. In 2 cases strabismus is the descriptive term employed, in one of which it was an alternating divergent strabismus. In 10 cases (11 eyes) the ocular movements were full and free, and, therefore, it may be assumed that there was no involvement of the muscles, or of the nerves supplying the muscles, while in 16 cases there is no statement to indicate whether or not there was an implication of the external ocular muscles.

It is, therefore, evident that 48 eyes among the 59 cases of this series gave evidence of some affection of the extra-ocular muscles, while 11 eyes escaped in so far as anomalies of the ocular muscles are concerned. Glaucoma has been reported once (Bossalino), and cataract twice.

Retina and Optic Nerve. Optic neuritis, optic nerve atrophy, retinal hemorrhages, and macular changes are reported in a number of instances, and these ophthalmoscopic changes form an important part of the ocular symptomatology of pulsating exophthalmos. In fully 20 per cent. of the cases of the present series some degree of optic nerve atrophy has been noted, and, practically, all of the blind eyes already reported lost their vision from this cause. In 3 instances a decided optic neuritis was present, in two of which it is described as choked disk, and four observers note retinal hemorrhages and two of them changes in the macular region dependent upon the deposition of small infiltrates. One patient suffered from embolism of the central artery of the retina following ligation of the common carotid. The retinal vessels themselves may be overdistended and tortuous, and in one notable instance reported by P. Knapp, these vessels, temporarily at least, showed a series of alternating constrictions and dilatations, somewhat resembling strings of beads. In a case already reported by one of us (de Schweinitz) this great distention not only of the retinal vessels with unequal constrictions, but also of the exterior ocular vessels, particularly of the conjunctiva, was a marked feature of the process.

Other Disturbances of Special Sense and Motility. In 9 cases hearing was impaired or lost, although such defect does not necessarily mean an involvement of the auditory nerve. Impairment of taste and of smell is reported once each, respectively.

Involvement of the first branch of the fifth nerve, in one instance bilateral, although the exophthalmos was unilateral, is definitely recorded five times, while in two instances the inference that this nerve was affected is a fair one, and in one case both the first and the second portion was implicated. Facial paralysis, or some involvement of the facial nerve, was found in five cases, while in a sixth it was present as a postoperative phenomenon, but was transitory in character.

The Pulsation and the Bruit and their Character. Pulsation is a conspicuous symptom, and this may be either visible or demonstrable only upon palpation, and occurred, as a matter of record, in practically all of the cases in the series now under consideration. As a secondary symptom often present is the collection of enlarged veins at the inner angle of the orbit, as the most frequent and conspicuous place for their appearance, although sometimes they spread over the surface of the lid and on to the temporal region. In the 69 cases of our series some form of bruit is described in all except 9. In 21 it was systolic, in 3 continuous, in 5 continuous with systolic accentuations, while the character of the bruit is not described in 31 of the cases, although bruit is stated to have been present. The exact region of the bruit is not described in 27 of the cases. It is stated to have been local—that is, heard over the eye, or the eye and the temple—in 18 of them, and general—that is, heard over the whole skull, or the greater portion of it—in 24. As is well known, the character of this bruit, in so far as the sensations of the patient are concerned, is often a most distressing one, and may be puffing or roaring or singing, and sometimes is controlled by pressure of the carotid and sometimes not. Pulsation, on the other hand, either where this is visible or where it is demonstrable only by palpation, is practically universally controlled by pressure, in some instances, however, requiring a pressure of the carotid on both sides.

A summary of the conspicuous symptoms which may arise in the course of this disease is, therefore, as follows: Exophthalmos, most frequently with the eye displaced outward and downward; bruit usually heard over the eye and above the orbit, but sometimes audible over the whole skull, and evident to the patient in a roaring, humming, buzzing, or hissing sound; pulsation, not constantly present, which may be visible or demonstrable only by palpation, or by pressing the globe backward into the orbit; distention of the veins at the inner angle of the orbit, with especially enlargement of the angular vein and of those in the lid and even in the forehead and on the surface of the conjunctiva; corneal complications, usually in the form of exposure keratitis; often hyperemia of the iris and rarely actual iritis; commonly hyperemia of the nerve head and occasionally optic neuritis; frequently marked distention of the retinal veins and scattered retinal hemorrhages; disturbances of ocular motility, sometimes so extensive as to implicate all of the exterior ocular muscles, sometimes only one or other of them, and with the external rectus most frequently affected when a single muscle is involved. Other less conspicuous symptoms sometimes present are involvement of the trifacial, of the facial, and disturbances of taste, smell, and hearing.

Pathogenesis. Ordinarily pulsating exophthalmos is a unilateral manifestation, appearing on the same side as the lesion, but the disease may be bilateral, and a number of such cases are upon record, 7 occurring in the 69 which are under consideration this evening. The explanation of bilateral exophthalmos is the following: The traumatism, for example, a fracture at the base of the skull, establishes a communication between the internal carotid artery and the cavernous sinus upon one side, leading to distention or varicose dilatation of the orbital veins. Later, there is extension of the process by the transverse and circular sinus to the venous channels upon the opposite side. A true pulsating exophthalmos of intracranial origin depends upon a communication established between the internal carotid and the cavernous sinus, that is to say, there is an arteriovenous communication. On account of the exactly analogous system produced, it may not be possible to differ-

entiate these cases from those which are caused by aneurysm of the internal carotid in the cavernous sinus and extra-orbital aneurysm of the ophthalmic artery.

Pulsating exophthalmos may also be caused by orbital conditions: Aneurysm of the ophthalmic artery in the orbit, by tumors of the orbit or by those encroaching on it from the sinuses or the brain. To appeal to postmortem evidence, we note that in the present series are the records of 11 autopsies, which may be briefly summarized as follows: Rupture of the carotid in the sinus, together with rupture of an aortic aneurysm and endarteritis of the internal carotid (Debayle); rupture of an aneurysmal sac in the internal carotid into the sinus, with softening of the left hemisphere of the brain and extensive arteriosclerosis (Karplus); rupture of a dilated internal carotid in the sinus with probably arteriovenous aneurysm of the orbit and extensive arteriosclerosis (Cantonnet and Cerise); infiltration of the sinus with blood, a thinned internal carotid without demonstrable rupture (Gruner). All of these autopsies were in spontaneous cases.

Among the traumatic cases in our series are 5 autopsies, with the following results briefly summarized: Double sac aneurysm of the internal carotid, no rupture discovered; brain abscess (Barnard and Rugby); thrombosis of the sinus, no rupture found (Neff); double rupture of the artery in the sinus (Usher); distention and rupture of the cavernous sinus, which was probably injured by an umbrella rib (Gibson); rupture of an aneurysm of the internal carotid into the cavernous sinus (Jack and Verhoeff). In one case, the cause of which is not stated, that is to say, whether it was a traumatic or a spontaneous pulsating exophthalmos, calcification and rupture of the internal carotid into the sinus were found at the autopsy (Brandes). In another case there was fibrosarcoma of the orbit.

It will, therefore, be seen that in 6 of these 11 cases there was an actual arteriovenous communication demonstrated, and in 3 of them, although the rupture was not found, it is quite possible that it was present, for, as Sattler has pointed out long ago, it is difficult to be positively certain whether or not there has been in a thinned wall of the carotid a small communication which has escaped detection.

In Jack and Verhoeff's recently reported case, where the communication was found between the aneurysm and the cavernous sinus, it is stated to be the seventh case in which the presence of such a rupture was absolutely proved. We think, however, that they must be mistaken in this statement, because so long ago as 1898, in Slomann's careful analysis of 175 cases of true pulsating exophthalmos, a postmortem section positively demonstrated a rupture of the internal carotid into the cavernous sinus in 8 cases, and in 8 others this was probably the lesion. As all of these 8 cases occurred prior to the analysis which we ourselves have made, we are quite safe in saying that such a lesion has been demonstrated positively in 14 autopsies and was almost certainly present in 11 more. There are now upon record 313 cases of pulsating exophthalmos and 40 autopsies. Among the intracranial cases the number in which this arteriovenous communication occurred is certainly as great as we have stated it, and probably greater.

An arteriovenous communication in the sinus so acts upon the pressure in this sinus that a stasis is created which often leads to great dilatation of the superior ophthalmic vein. This vein, formed at the inner angle of the orbit by the union of two vessels coming from the supra-orbital and angular veins, empties into the anterior part of the cavernous sinus. Its distention transmitted to its anterior portion, or the nasofrontalis vein, and to the angular vein, accounts for the enlarged and often compressible venous mass noted in these cases at the inner angle of the orbit. Its important relation to one form of operative interference will be discussed presently.

Diagnosis and Differential Diagnosis. As may be inferred from the previous pages, the diagnosis of pulsating exophthalmos is a comparatively simple matter, although the determination of the underlying etiological factor is often difficult, especially when it is remembered that the symptoms produced by rupture of the internal carotid into the cavernous sinus may almost be exactly repeated by an aneurysm of the internal carotid in the cavernous sinus and by an aneurysm of the ophthalmic artery. It is probable that a decided intensity of the bruit, especially if it is continuous and exhibits

systolic accentuations, together with a vigorous pulsation of the eye and of the venous mass at the inner angle of the orbit, point more strongly to the presence of arteriovenous communication than to either of the other conditions. If after traumatism, particularly a blow upon the head, and a period of unconsciousness, associated with hemorrhage from the nose, mouth, or ears, and with the symptom of lesions of some of the cranial nerves, in addition to those which furnish the ocular supply, and especially of the facial and of the auditory nerves, there is reason to believe that a communication between the artery and the cavernous sinus has been established as the result of a basal fracture. As a rule, the pulsating exophthalmos occurs on the same side of the head as the trauma, but this is not an invariable rule. There are cases on record in which, following a blow on the right side, there was right-sided exophthalmos, with the subsequent development of pulsating exophthalmos upon the left side, and in another instance an exophthalmos of the left eye followed a left-sided trauma, but was followed almost immediately by pulsating exophthalmos of the right eye. The spontaneous cases usually exhibit a rapid development of all of the symptoms and are often accompanied by the evidences of general vascular changes. It is impossible to differentiate between an extra-orbital and an intra-orbital aneurysm of the ophthalmic artery, and, as Bull has pointed out, if a true aneurysm of the ophthalmic artery within the skull produces pulsating exophthalmos, it must be of rapid development, otherwise the signs of stasis and pulsation in the orbit would be absent, on account of the establishment of collateral circulation.

Vascular tumors of the orbit may be confused with pulsating exophthalmos, but in the former the symptoms develop more slowly, the orbital growth may be palpable, and the efforts to reduce the exophthalmos encounter greater resistance, while the murmur, if present, is feeble, intermittent, and often heard best over the corresponding temple. So, too, the pulsating venous mass, if it exists, is apt to be situated at the outer angle, or out and up, or out and down, rather than at the upper and inner angle, its point of election in the true cases of pulsating exophthalmos. In all doubtful cases

there should be a thorough examination of the accessory sinuses, and it has been suggested to employ the *x*-rays, particularly in fractures of the skull, and in gunshot injuries with retention of the bullet or shot, and to demonstrate the presence, absence, or loss of the osseous walls of the orbit. A few times orbital encephaloceles have been confused with pulsating exophthalmos, but they are unlikely to be associated with a bruit, and ophthalmoscopic examination is negative.

Treatment. Treatment divides itself into: (1) Ligation of the larger bloodvessels of the neck; (2) operations upon the orbit; (3) compression of the common carotid; (4) direct compression of the venous swelling in the eyelids and angle of the orbit; (5) gelatin injections; (6) the administration of certain drugs and rest in the recumbent posture.

In our list of 69 cases there were 36 ligatures of the common carotid, with cure or improvement in 19 (or 52.8 per cent.), recurrence in 7 (or 19.4 per cent.), negative results in 5 (or 13.9 per cent.), and deaths in 5 (or 13.9 per cent.). In 3 other cases of ligature of the common carotid death occurred, but not as the result of the operation, in one from a late brain abscess, in another from suicide, and in a third from a fibrosarcoma.

Ligature of the common and the external carotid was practised by one surgeon (Würdemann) with a resulting cure. Ligature of the external and internal carotid was practised 6 times, with the following results: One cure (Usher, second case), two improvements (Siegrist and Lambert), one recurrence (Wiemuth), one negative result (Burghard and Prichard), and one death. Ligature of the external carotid was performed without result by one surgeon (Gifford).

Ligature of the internal carotid yielded the following results: Cure once (Debayle), improvement 4 times (Sobernheim, Frazier, Delanglade, Ponos and Cushing), negative result once (Houillon). Ligature of the common and the internal carotid was practised once with a cure (Thierry).

In so far as the results of ligation of the common carotid are concerned, it is interesting to compare the operative procedures

prior to the beginning of the present series, and for this purpose we quote from Reuchlin as follows: In 116 cases of ligation of the common carotid cure resulted in 80 (or 68.8 per cent.), negative result in 25 (or 21.5 per cent.), and death in 11 (or 9.5 per cent.).

If we add together Reuchlin's cases and our own, the result is as follows:

Ligatures of the common carotid, 152 cases, with cure or improvement in 99 (or 65.2 per cent.), failure in 37 (or 24.3 per cent.), death in 16 (or 10.5 per cent.).

Although the common carotid is the vessel usually selected for ligation, and in some instances, in the event of failure, the vessel upon the opposite side has been tied, some surgeons, for example Reid, prefer ligation of the external and internal carotid, inasmuch as they believe that this procedure diminishes the chances of the re-establishment of the circulation through the external carotid. In our own series it will be remembered that this operation was performed 6 times, with 1 cure, 2 improvements, 1 recurrence, 1 negative result, and 1 death; results, it would seem, which do not indicate that this procedure should be preferred to ligation of one or both common carotids.

2. *Orbital Operations.* In 1897 Szimanowsky, after a failure from ligation of one carotid, suggested ligation of the distended superior ophthalmic vein. Since that date, Bodon, Golowin, Schwalbach, Sattler, Gifford, and others have resorted to this procedure, with good results. In brief, the operation consists in a dissection of the orbit with a double ligature and resection of the dilated vein, and depends in all probability for its favorable action upon a thrombosis which spreads from the seat of ligature backward. In our series of 69 cases we have found 6 orbital operations, which, briefly summarized, are as follows: (1) Ligature and excision of a portion of the superior ophthalmic vein, with cure after failure of direct compression to the local swelling, compression of the carotid, and ligation of the common carotid (Schwalbach); (2) ligation of the angular vein, with cure after failure following ligation of the common carotid and subsequent ligation of the external and internal carotid on the same side (Burghard and Prichard); (3)

ligation of the superior ophthalmic vein and extirpation of the venous ectasia, with cure after failure of local compression of the mass and ligation of the common carotid (Wiesinger); (4) excision of a portion of the superior ophthalmic vein as the primary procedure, with cure; prior to the operation the common carotid was exposed in order that it could be ligated if necessary (Sattler); (5) excision of the much-distended superior ophthalmic vein, with cure after failure of ligation of the external carotid and ligation of the common carotid (Gifford). In 3 cases there were orbital operations all resulting in cure, in which, however, there was no excision of this superior ophthalmic vein. In one, after dissection of the orbit, the ophthalmic artery was ligatured, the patient having had an aneurysm, partially extra-orbital, of this artery (Lewis). In another, a mass of orbital tissue which projected from the orbit and the inner surface of the lower lid near the interior canthus was extirpated, and a cure resulted after repeated hemorrhages from this mass had followed ligation of the external and internal carotid, with the lingual and facial branches; in a third case deep incisions were made into the orbit, and nothing else was done. It is possible that in the last two of these cases the operation may have had some influence in producing backward the formation of thrombus, or that they should be regarded as spontaneous cures.

So far as we have been able to ascertain all operations which have been performed on the orbit and have included ligature and resection of the superior ophthalmic vein have been successful. It would seem that this procedure should be considered before ligature of the common carotid, with its mortality of 10 per cent. and failure of 24 per cent., is resorted to, and certainly should precede ligature of the second common carotid, provided the first operation has failed to produce the desired result. If a distended vein can be felt in the orbit, as Gifford points out, it should be the operation of choice. Thus far no ultimate unfavorable results have followed the operation, but in 3 cases there have been temporary, somewhat alarming "brain symptoms," with headache and slow pulse, due probably to extension of the venous thrombosis into the cranial cavity.

3. *Compression of the Common Carotid.* In our list of 69 cases compression of the common carotid was resorted to 12 times, with 2 cures, 3 improvements, and negative results in 7 cases, while a direct compression to the venous swelling is reported 3 times without result. In 68 cases of digital compression collected by Renchlin, there were 15 cures (or 22.1 per cent.) and 52 failures (or 76 per cent.). This procedure achieves its best results in the cases of spontaneous origin, and if practised prior to ligature may lessen subsequent heart-strain by partially establishing a collateral circulation.

4. *Gelatin injections* are reported 3 times: once by Reynier, with a cure after a recurrence which followed ligation of the common carotid, and twice without result, in one instance after ligature and re-ligature of the same common carotid, and in one patient with a fibrosarcoma of the ethmoid.

5. *The administration of drugs* resulted as follows: Improvement is claimed by rest in bed, the administration of potassium iodide and calcium chloride by Evans; cure after the administration of potassium iodide and the local administration of adrenalin is reported by Gasparini; improvement after the administration of trional and bromide, together with the use of cold compresses and leeches, is recorded by Punzo, who was himself the subject of this disease; improvement after the administration of iodide is described by Tierry; while negative results are published by Mackey after the Tuffnell treatment with iodide, and by Calderaro after the use of bandages, leeches, and the galvanic current.

It would seem that in a few instances *spontaneous cure* has occurred, and in certain other cases in which a cure is attributed to remedies so trivial in their action that it is difficult to believe that they themselves could have had any positive result, the same explanation is probable. Two of these spontaneous cures, or probable spontaneous cures, are interesting enough to deserve extended mention, one occurring two years and eleven months after an operation which included ligature of the right common carotid and left internal carotid, which was followed by some improvement, and in another case ten and one-half years after the accident, the

preceding treatment having been digital and mechanical pressure. The following conclusions seem to be justified:

In the presence of true pulsating exophthalmos surgical procedures should take precedence, and time is probably wasted by an attempt to cure the lesion by the administration of drugs, although injections of serum gelatin may be considered if the presence of an aneurysm of the ophthalmic artery is known to exist.

Of the ligations of the neck arteries the best results are liable to follow ligature of a common carotid, as the contention that ligature of the external and internal carotid is the preferable procedure is not borne out by the statistics. If there is failure to relieve or cure the symptoms by the ligature of one carotid before the second carotid is tied, the orbital operation of dissecting out and tying the distended vein should be tried.

In the presence of a distinct venous swelling in the orbit, with evident distention of the angular or superior ophthalmic vein, the operation of choice should be isolation, ligature, and resection of this venous channel, inasmuch as thus far, although the operations are few in number, they have been uniformly successful.

Exhibition of Patient by Dr. de Schweinitz in Connection with Paper.

In the absence of Dr. Frazier I exhibit this patient, on whom he operated for the relief of pulsating exophthalmos by tying the right common carotid in April, 1900, and the left internal carotid in February, 1901. After both of these operations there was temporary relief of the symptoms; later they returned, and nearly three years after the last operation the patient, while playing football, received a blow on the head, and immediately afterward noticed the cessation of bruit. At the present time his eyes are normal in appearance and are actually normal in all respects. The patient was originally referred to Dr. Frazier by Dr. C. A. Oliver, who has reported the case in detail.

DISCUSSION.

Dr. T. B. Holloway: In the summary of the 69 cases just referred to, all were cases that might be included as pulsating exophthalmos.

I think that several among the atypical or doubtful cases should be referred to, for at least two of these where reported as pulsating exophthalmos and were excluded from the series because they lacked one of the essential features of this condition, namely, the bruit. One of these cases, reported by Maynard and Rogers, occurred in a girl of fifteen years, who was subject to epileptic seizures. There existed an exophthalmos and pulsation which could be felt upon deep orbital pressure.

The patient passed from observation, but subsequently returned with sloughing cornea, which necessitated enucleation.

At the time of enucleation the optic nerve was found to pass into the pulsating mass, the exact character of which was not determined. The original diagnosis had been angioma of the orbit.

The autopsy showed the mass to be a sac-like dilatation of the optic nerve, which extended back to the base of the brain and communicated with a dilated third ventricle. In the case reported by Ercklentz, there was also an absence of the bruit. Here there was an absence of the upper posterior wall of the orbit, the pulsation being due to direct pulsation transmitted from the brain.

One other case, reported by Kreutz, also lacked a bruit.

In this instance a circoid aneurysm developed between the inferior maxilla and the mastoid process and transmitted a pulsation to the lobe of the ear. There was associated with this a circoid aneurysm in the orbit and also one involving the central artery of the retina, all the minute vessels about the posterior pole being dilated, and between the disk and the macular region was a tangled mass of dilated vessels.

In reference to the trauma, as a rule, pulsating exophthalmos develops on the side corresponding to the trauma.

This is not, however, always the case, as is illustrated by the Calderaro case.

I think surgeons must be impressed by the uniformly good results following the orbital operations referred to.

Dr. John B. Roberts: I had the opportunity of seeing two or three cases of this sort some years ago, but did not have charge of the patients. It interests me very much to see how the later developments of surgery have opened up a field for which we surgeons surely ought to thank, among others, those who have brought the present paper to our attention. We have learned that brain lesions should be dealt with directly rather than indirectly; and it is suggestive that going into the orbit and attacking that which causes the pulsating exophthalmos is the thing to which we should now first give attention. If ligation of the exophthalmic vein does not stop pulsation of the eye, and the discomfort of

the patient continues, it might in some instances be desirable to open the posterior wall of the orbit and get into the cranial cavity itself. From what we have heard to-night, and from our knowledge of the safety of aseptic operations, it is clear that it would be well to delay operations upon the large arteries of the neck until we have thoroughly explored the deep part of the orbit.

Dr George C. Harlan: I have seen a good many eye cases in the last forty-odd years, but have had only two cases of pulsating exophthalmos to treat. Both were under my care at the same time. Up to thirty years ago, as Dr. de Schweinitz has said, these cases were described as aneurysm of the orbit, but when a number of them came to postmortem it was found in nearly all that there was no disease in the orbit, but that the pulsation and exophthalmos were due to some lesion behind the orbit.

One case under my observation, a congenital one and supposed to be an aneurysm by anastomosis, had, in addition to all the clinical symptoms now recognized as pulsating exophthalmos, an enormous hypertrophy of the face and head. After some time the patient had an attack of erysipelas in the face. Following that the pain and bruit disappeared and there was considerable diminution of the swelling.

Another case was typical of arteriovenous aneurysm from fracture of the base of the skull. This case recovered under the use of intermittent compression.

(History of previously published case read by Dr. Harlan.)

Dr. de Schweinitz (closes): As Dr. Harlan has pointed out, a certain number of cases of pulsating exophthalmos have been cured by various forms of digital compression. In our list of 69 cases gathered from the literature, compression of the common carotid was resorted to 12 times, with 2 cures, 3 improvements, and 7 negative results. In 68 cases of digital compression collected by Reuehlin, there were 15 cures (or 22.1 per cent.) and 52 failures (or 76 per cent.). It will, therefore, be seen that within certain limits this procedure has a right to be considered among the measures utilized for the relief of pulsating exophthalmos, and has achieved its best results in cases of spontaneous origin. I believe, however, with Sattler, that its only real value is preliminary to ligation, under which circumstances it may lessen subsequent heart-strain by partially establishing a collateral circulation.

I am persuaded that, with the exceptions already noted in the paper, time is wasted in the treatment of this disease which is spent in any procedure except a surgical one, and that the decision must lie between ligation of the blood-vessels in the neck and isolation and ligation of the distended veins in the orbit, particularly the superior ophthalmic vein. As has already been pointed out, the statistics which we have gathered and presented this evening indicate that the latter procedure has been uniformly successful and should certainly be seriously considered if examination revealed the presence of a dilated superior ophthalmic vein, and probably always be resorted to if ligation of one carotid failed to relieve the symptoms before ligation of a second carotid is undertaken.

EXHIBITION OF PATIENT WITH UNUSUAL BONY GROWTHS.[1]

By J. K. MITCHELL, M.D.

The patient is a boy of eighteen years; family history negative. At eight years of age he had typhoid fever, not of unusual severity. Before that time he was always well. After suffering for two weeks with typhoid fever, the family noticed swellings upon the legs and afterward in other places, which grew in the next few months to moderate size. They did not increase much in size in the next eight years, but the last two years they have increased rapidly. In the past few months they are growing less fast. There are several large nodes situated in different parts of the body. Two are on the inner sides of the femora, just above the knee-joints. One is on the upper third of the left side of the left femur; one in the middle of the forearm; one in the upper part of the humerus, also on the left side; one above the ankle on the tibia; eight or nine altogether. The first possibility suggested to my mind was that they were perversions of growth from the epiphyses, but examination showed some of the growths to be in the middle of the long bones and not on the growing ends. The fact also is peculiar that they have grown for a time and then ceased to grow. They are not tender or painful. I have made several attempts with various forms of local and general treatment to stop them, without much effect. It is possible that the cessation of growth may continue, as they have not increased for several months. They are large enough to cause some inconvenience, especially at the knees, as the boy is a little knock-kneed.

[1] Read November 6, 1907.

DISCUSSION.

Dr. John B. Roberts: I reported a case some years ago presenting a somewhat similar condition in the face, in which the lower jaw was greatly enlarged by bony growths; the upper jaw was also involved to a certain extent. The patient was shown at the section on General Surgery of the College, and is recorded in the *Annals of Surgery*, 1896, vol. xxiii, p. 303. The cases I have seen have had fewer ossific growths than this. The condition is curious and comes under the head of leontiasis ossium. It is probably best treated by shaving off the bone with a sharp chisel. In Dr. Mitchell's case the osteophytic growths are more numerous, but the pathology of the disease is probably similar. In my report mentioned there was some reference to the pathological changes found by investigators of the condition.

PERFORATION OF THE GALL-BLADDER DURING TYPHOID FEVER; CHOLECYSTECTOMY; RECOVERY.[1]

WITH AN ANALYSIS OF TWENTY-ONE OPERATIONS ON THE GALL-BLADDER DURING TYPHOID FEVER.

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Although inflammation of the gall-bladder is frequently observed in typhoid fever, and though numerous cases of post-typhoid cholecystitis have been reported, yet operations for perforation of the gall-bladder during the course of the disease are sufficiently rare to make them worthy of record. For the privilege of reporting 2 cases, and of operating on the second patient, I am indebted to Dr. G. G. Davis, in whose service at the Episcopal Hospital they occurred.

Case I.—*Perforation of gall-bladder on thirty-second day of typhoid fever; exploratory laparotomy; death in twenty hours.* Clarence S., aged twelve years, was admitted January 26, 1907, to the medical wards of the Episcopal Hospital, under the care of Dr. A. A. Stevens. He had been ailing for about three weeks, but had been confined to his bed at home for the last week only, complaining of pain in the abdomen, nausea, vomiting, headache, and diarrhœa. There had been no epistaxis. On admission he presented a typical picture of a severe case of typhoid fever in the fourth week: face flushed, pupils dilated, tongue coated and dry, lips dry. Slight bronchitis. Heart normal. Abdomen soft; spleen enlarged and palpable; rose spots present. The Widal test was positive, and the leukocytes numbered 10,800. His temperature was 101.8° F.; pulse, 104; respirations, 24.

[1] Read November 6, 1907.

January 28. Quite delirious; moaning all the time in his sleep.

February 3. Still has mild delirium. Temperature has varied little, ranging from just below 103° F. to over 104° F. His pulse rate has varied from 120 to 130; and his respirations have been about 24 per minute.

5th. (Thirty-second day of disease.) At 10 A.M. was found to be in pain; had not complained of sudden onset of pain. He now has pain in right side of abdomen. Temperature, 104.4° F.; pulse, 132; respirations, 24. Leukocytes, 10,200. There is some rigidity of the right rectus muscle; the most tender spot is over the belly of right rectus, on level of umbilicus. No appreciable tenderness on left side. No distention.

11 A.M. Pain, tenderness, and rigidity considerably increased. The abdomen moves very little with respiration. The leukocyte count has fallen from 10,200 at 10 A.M., to 6600 at 11 A.M. 1 P.M. Pain, tenderness, and rigidity still more increased; also more distention. Tenderness is no longer so sharply localized, but has spread over entire abdomen; yet the most tender area is still on right side. 2 P.M. Temperature, 102.4° F.; pulse, 120; respirations, 36. Leukocytes, 6200. A study of the temperature chart shows that there had been a steady rise of temperature, beginning the morning of February 3 (forty-eight hours ago), from 101.8° to 104.4° F., and that on the occurrence of perforation this morning there was a fall of 2° (to 102.4° F.) within three or four hours. There has been practically no change in the pulse rate. The leukocyte count fell within four hours from 10,200 to 6200. A diagnosis of probable intestinal perforation was made. 3 P.M. Laparotomy (ether) by Dr. G. G. Davis, five hours after the occurrence of perforation. A transverse incision was made in the right iliac region, at the level of the anterior superior iliac spine, splitting the anterior and posterior sheaths of the rectus and the transverse abdominal muscles. Considerable bile-stained fluid was found on the gauze sponges inserted among the intestines. The entire small intestine and about six inches of the ascending colon were explored, but no perforation was found. All the intestines were markedly injected and inflamed. On account of the patient's critical condition, no further attempt was made to find the lesion causing the peritonitis. A rubber tube and iodoform gauze drain were introduced, and the wound partially closed.

6th. The patient died at 11 A.M., twenty hours after operation. Chemical examination of the fluid removed at operation showed the usual reactions for bile. Postmortem examination through the wound of operation showed general peritonitis, with a perforation of the gall-bladder.

CASE II.—*Perforation of gall-bladder on forty-second day of typhoid fever; cholecystectomy; recovery.* John S., aged twenty years, was admitted February 15, 1907, to the medical wards of the Episcopal Hospital, under the care of Dr. A. A. Stevens. His chief complaint was diarrhœa and weakness. His family history was negative, and he had never been ill before. His present illness

began two weeks before admission, with headache, malaise, anorexia, cough, diarrhœa, and general weakness. There had been no epistaxis. He had not been in bed constantly before admission.

On admission his temperature was 104° F.; pulse, 120; respirations, 24. His face was flushed, his pupils normal, his tongue coated and moist, and his throat clear. His lungs were clear, and his heart was normal. The abdomen showed slight distention and tenseness; no rigidity; no gurgling; some general tenderness. Spleen very slightly enlarged to percussion. There were a few typical rose spots on the abdomen. The Widal test was positive, and the leukocytes numbered 8000.

His temperature pursued a rather irregular course, falling considerably after each bath, then rising again, but showing a gradual tendency to subside. It became normal about the thirty-seventh day of the disease, but again began to rise irregularly on the thirty-ninth and fortieth days. For a week he had not been tubbed. His bowels had been constipated, but were opened occasionally by enemata. His pulse varied from 68 to 80.

March 14. (Forty-first day of disease.) His temperature shot up to 103.2° F. at 4 A.M., and he was tubbed. At 8 A.M. his temperature was 104° F.; pulse, 120; and he was again tubbed. He now vomited some greenish fluid. At 10 A.M. he complained of not feeling so well as on previous mornings. He complained of no pain anywhere. On deep palpation below the right costal border there was slight though distinct tenderness. No mass palpable. Apparently no distinct rigidity. His general condition was good. The leukocytes numbered 24,400. At 12 noon, temperature 104.8° F. No bath. Ordered calomel, grain ¼, hourly for six doses, to be followed by half an ounce of Epsom salt. At 4 P.M., temperature 104.2° F. No bath. At 8 P.M., temperature 103.6° F. No bath. At 11.30 P.M. it is noted that both local and general conditions had remained about the same during the day. Patient had vomited all medicines during the day. Probably the tenderness below the right costal border was slightly increased. Temperature, 104.4° F.; pulse, 116; respirations, 28.

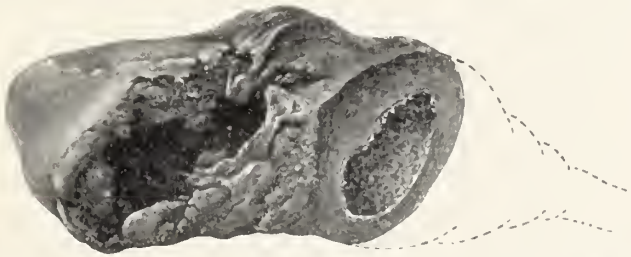
15*th*. (Forty-second day of disease.) 4 A.M.: temperature, 100.2° F.; pulse, 136; respirations, 28. Pain and tenderness are now severe in right upper abdominal quadrant. He has vomited some more green fluid. The skin is somewhat leaky. The pulse is rapid, but of good volume. Entire right half of abdomen is very rigid, but practically all pain and tenderness are above the level of umbilicus. There is no distention, nor is there dulness in the flanks.

A diagnosis of perforation of the gall-bladder was made by the resident physician, Dr. von Buddenbroek, and I was sent for.

When I first saw the patient he looked like a man of forty years. It was surprising to be told he was only twenty years of age. His expression was characteristic—not the Hippocratic facies, but rather a general weakening of all the features—a change which has been particularly alluded to by Dr. Harte.

With the history of a rapid rise of the temperature from nearly normal almost to 105° F., followed by abdominal pain, tenderness, and rigidity, the existence of intra-abdominal mischief was sufficiently evident. The localization of the symptoms to the right upper abdominal quadrant, and the memory of the perforated gall-bladder observed only a few weeks previously, strongly suggested that the gall-bladder was the seat of trouble in this patient. Following this train of symptoms, which had rapidly developed within the last twenty-four hours, came the sudden drop of more than 4° in the temperature within the space of three hours, with the coincident quickening of the pulse from 110 to 136 and the occurrence of sweating. With such a history and train of symptoms, the diagnosis of perforation of the gall-bladder seemed justified.

At 8 A.M. laparotomy (ether) was done by Dr. A. P. C. Ashhurst, four hours after the occurrence of perforation. A small exploratory incision was made through the outer border of the right rectus muscle, splitting its fibers above the level of the umbilicus. There was a little free serum, but there were no adhesions to the parietal peritoneum. As the transverse colon was seen to be adherent above to the liver, the incision was extended upward, its total length being four



Case II.—Typhoid perforation of gall-bladder. Specimen removed by cholecystectomy.

inches. The upper abdominal region was then carefully isolated by gauze packs, and the adhesions, which were light and evidently of quite recent formation, were cautiously ruptured. There at once welled up from above the transverse colon some more serous fluid, which was quickly followed by four or five ounces of thick, inodorous, milky pus. This pus, which seemed to come from the under surface of the liver, was rapidly sponged away. (A culture made during the operation gave a pure growth of typhoid bacilli.[1]) The pylorus and duodenum were then recognized, as well as the round ligament of the liver. Then the gall-bladder was found, further to the patient's right, buried in rather dense adhesions between the liver and the colon. There was a large and ragged perforation, measuring $1\frac{1}{4}$ x $1\frac{1}{2}$ inches, in its lower and inner wall, not involving

[1] My thanks are due to Dr. D. L. Despard, Assistant Pathologist to the Episcopal Hospital, for his very painstaking and persistent search for microörganisms in sections cut from the margins of the perforation in the gall-bladder. In spite of the use of varied stains and the examination of numerous sections, he was unable to demonstrate the presence of the typhoid bacillus in the tissues.

either fundus or neck, and accounting by its size for the collapsed condition of the gall-bladder. The gall-bladder was enucleated; its neck was ligated with chromic catgut, and it was cut away. A rubber tube and two gauze packs were inserted as drains; the isolating packs were removed, and the abdominal incision partly closed with through-and-through silkworm-gut sutures. The operation lasted twenty-three minutes, and the patient was in a very precarious condition at its conclusion. A wet dressing of alcohol and salt solution was applied over the whole abdomen, and in the manner of a poultice was covered with waxed paper and absorbent cotton. Throughout the operation the patient had been surrounded by hot-water bottles, and every effort was made to prevent chilling him.

The patient was given one-thirtieth of a grain of strychnine sulphate and ten minims of the tincture of digitalis every fourth hour hypodermically. He also received six ounces of hot saline solution, with four ounces of peptonized milk, every fourth hour by enema. He was given one hypodermic injection of an eighth of a grain of morphine sulphate.

16*th*. There was some bilious vomiting the next day, but this was arrested by washing out the stomach. His head was clear, and he felt well except for tenderness over the wound.

17*th*. The dressings were bile-stained on the third day, and fluids were given by mouth; also one-half ounce of whisky every sixth hour.

20*th*. Five days after the operation the patient was lying on his right side, and considered himself convalescent. Gastric lavage was again employed for bilious vomiting. The drainage tube was removed, and the gauze on the gastric side was loosened.

21*st*. Six days after the operation the temperature reached normal. "The patient lies on the right or left side. There has been no more vomiting."

With the exception of one rise of temperature to 101° F., recovery was uneventful. The last gauze was withdrawn, and feeding on soft diet was begun on the ninth day after operation. No pus discharged from the wound after the first week, and the discharge of bile gradually lessened. In the fourth week after operation the temperature rose for a couple of days to 103° F., owing to the development of an acute otitis media, and in the fifth week a furuncle on the leg caused a rise to 103° F., but finally convalescence was assured. The sinus ceased to discharge in the fifth week, and the patient was sent home well, May 15, 1907, just two months after the operation.

The successful result in this case may be attributed to several factors. Among causes which may be said to have predisposed to his recovery are: (1) The stage of the disease at which perforation occurred when the height of the fever was past; (2) the existence of a pure typhoid infection uncontaminated by the more deadly

colon bacillus or by the streptococcus; (3) the youth of the patient —only twenty years—and his good constitution; and (4) the short period—four hours—that elapsed between perforation and operation. The excellent tissue reaction shown by the patient, evidenced by the leukocytosis of 24,400, and by the promptitude with which protective adhesions were formed, must also be considered. As exciting causes should perhaps be mentioned the fact that the gall-bladder was excised, and that such care was taken to prevent diffusion of the infection below the transverse colon. Two months in the hospital after either a cholecystectomy or an attack of typhoid fever would be an abnormally long sojourn, but when both occur simultaneously in the same patient, the rate at which strength is regained is exceptionally slow.

This patient is present this evening. He is in excellent health, has been at his work as paper-cutter all summer, and feels no inconvenience from the operation. The scar has contracted to a length of less than three inches; it is firm and unyielding, and there is no impulse on coughing.

In connection with these 2 cases from the Episcopal Hospital, I have analyzed the reports of 19 other operations, done during the course of typhoid fever, for lesions of the gall-bladder. A number of operations done after complete recovery from the disease, for post-typhoid affections of the gall-bladder, have not been included. Such operations have been recorded by Gibbon,[1] Harte,[2] Halsted,[3] Deaver,[4] Martin, Frazier,[5] and other surgeons. A case reported by Dr. H. B. Allyn,[6] in which operation was done by Da Costa for perforation of the colon into an adherent gall-bladder, was included in the tables I published some years since in collaboration with Dr. Harte;[7] it is not included in the present table because it was thought by Dr. Allyn that the perforation originated in the colon and not in the gall-bladder.

Taking, then, only those 21 operations done before the patients recovered from typhoid fever, we have a record of 8 recoveries and

[1] Annals of Surgery, 1901, xxxiii, 70.
[2] Ibid., 71.
[3] Trans. Assoc. Amer. Phys., 1897, xii, 390, Case 2.
[4] Kelly, Amer. Jour. Med. Sc., 1906, ii, 459 Case 7.
[5] B. A. Thomas, New York Med. Jour., 1907, ii, 688.
[6] Philadelphia Med. Jour., 1901, ii, 193.
[7] Annals of Surgery, 1904, i, 7.

13 deaths, or a mortality rate of 61.9 per cent. In 4 cases, all fatal, the operation was abandoned before the gall-bladder lesion was found. Should it seem proper to anyone to exclude these cases, it would leave a total of 17 completed operations, with 8 recoveries and 9 deaths, or a mortality rate of less than 53 per cent. Compared with operations for intestinal perforations during typhoid fever, which give an average mortality, in collected cases, of from 75 to 80 per cent., operations on the gall-bladder during typhoid fever may seem almost benign; but their real gravity is apparent when they are compared with similar operations on patients without constitutional disease. In these the mortality varies from 3 to 10 per cent.

The operations employed in the present series of cases may be seen in the following table:

TABLE I.

Operation.	Cases.	Recovered.	Died.	Mortality. Per cent.
Aspiration of gall-bladder through unopened abdominal wall	1	1	0	
Cholecystendysis	2	1	1	50.00
Cholecystotomy and drainage.	9	4	5	55.55
Cholelithotomy.	2	0	2	100.00
Cholecystectomy	3	2	1	33.33
Operation abandoned without finding lesion	4	0	4	100.00
Total	21	8	13	61.90

The number of cases involved is of course too small for any definite conclusions to be drawn from a statistical study; but it may be said, in brief, that this complication seems to be most frequent in females between twenty and forty years of age, and during the second or third week of the disease.

The lesions found may be seen in the annexed table:

TABLE II.

Lesion.	Cases.	Recovered.	Died.	Mortality. Per cent.
Cholecystitis alone	4	2	2	50.00
Cholecystitis and empyema of gall-bladder	3	0	3	100.00
Cholecystitis, empyema, and peritonitis	4	2	2	50.00
Perforation with peritonitis	6	4	2	33.30
Perforation (found only at autopsy)	4	0	4	100.00
Total	21	8	13	61.90

The bacteria found were as follows:

TABLE III.

Bacterium.	Cases.	Recovered.	Died.	Mortality. Per cent.
Typhoid bacillus (pure culture)	9	5	4	44.4
Typhoid bacillus and colon bacillus	1	0	1	100.00
Paracolon bacillus	1	0	1	100.00
Not recorded	10	3	7	70.00

In two of the patients treated by cholecystectomy two small calculi were found in each gall-bladder. In the case of the patient tabulated as having been treated by cholelithotomy there were 152 and 150 gallstones, respectively. Thus, in only 4 cases (19 per cent. of the total number) were stones found in the gall-bladder. Among the 216 cases of infection of the biliary tract studied by Kelly,[1] 84.2 per cent. had calculi; this would make it appear that calculi do not particularly predispose to gall-bladder complications during typhoid fever. That the typhoid bacillus, however, is a rather frequent factor in the causation of subsequent inflammatory affections of the gall-bladder, is proved by Dr. Kelly's[2] earlier investigations, which showed that this organism was present in 10 per cent. of his patients.

The symptoms are recorded in all but 2 patients. There are two quite distinct classes of cases: In the first there has been a more or less gradual onset of abdominal pain, fairly well localized (by patients who were conscious) to the right hypochondrium, accompanied by localized tenderness, and frequently by a palpable mass, easily recognized as the distended gall-bladder. If operation has been undertaken at this stage, there has been found (*a*) cholecystitis; (*b*) empyema; or (*c*) empyema and commencing suppurative pericholecystitis. In the second class of cases the symptoms already mentioned have existed for a period varying from a few hours to a week or ten days, when suddenly there has been an acute attack of abdominal pain, accompanied by a fall of temperature (noted in 8 out of 10 cases), and sometimes by sweating; these signs being gradually followed, where immediate operation was not undertaken, by a secondary rise of temperature, a spread of the

[1] Amer. Jour. Med. Sci., 1906, ii, 755. [2] Ibid., 447.

pain and tenderness over the whole abdomen, and an increasing distention of the intestines. In one patient (Alexieff) a gall-bladder, which had been palpable for some days, suddenly collapsed and could no longer be detected on the occurrence of perforation. In a few cases, as in the first patient now reported (Davis), the delirious or semicomatose condition obscured the symptoms usually preceding perforation, and the only physical signs detected resembled so closely those of intestinal perforation that the diagnosis naturally inclined to this much more frequent complication.

It is interesting to note that out of the 21 cases reported a correct diagnosis was made in 11; in 9 cases the diagnosis made was intestinal perforation, and in 1 case (a woman eight months' pregnant) the only diagnosis was peritonitis.

As to the frequency with which the gall-bladder is involved in typhoid fever, no satisfactory statistics have been published. At the Episcopal Hospital the reports do not mention the complication of cholecystitis prior to the year 1905. From January 1, 1905, to October 1, 1907, there have been treated in our wards 2864 patients with typhoid fever. Among this number there were 243 deaths (a mortality of 8.48 per cent.). There are recorded 18 cases complicated by cholecystitis (about 0.62 per cent. of the whole number of cases); and among the cases thus complicated by cholecystitis there were 4 deaths. This, however, by no means implies that the deaths were due to the cholecystitis, since patients who at one stage presented symptoms of cholecystitis might recover from those symptoms and die at a later period from the toxemia of typhoid or from asthenia, yet they would still be reported as cases complicated by cholecystitis. Only two of these cases were considered serious enough for the thought of operation to be entertained; and it appears a mere coincidence that these two should both have been observed during the present year, within a few weeks of each other.

TABLE IV.

Cases of Typhoid Fever at the Episcopal Hospital, Philadelphia.

Year.	Cases.	Deaths.	Mortality. Per cent.	With gall-bladder complications. Cases.	Deaths.
1905	981	85	8.66	8	1[1]
1906	1339	107	7.99	6	2[2]
1907 (To Oct. 1)	544	51	9.37	4	1[3]
Total	2864	243	8.48	18	4

TABLE V.

Sex.	Recovered.	Died.	Total.	Mortality. Per cent.
Male	3	8	11	72.72
Female	5	5	10	.50

TABLE VI.

Age.	Recovered.	Died.	Total.	Mortality. Per cent.
Less than 10 years	1	0	1	0.0
10–19 years	1	4	5	80.0
20–29 years	2	3	5	60.0
30–39 years	2	4	6	66.6
40–46 years	2	2	4	50.0

TABLE VII.

Stage of disease.	Recovered.	Died.	Total.	Mortality. Per cent.
First week	0	1	1	100.0
Second week	0	3	3	100.0
Third week	1	4	5	80.0
Fourth week	1	1	2	50.0
Fifth week	2	3	5	60.0
Sixth week	3	0	3	00.0
Ninth week (relapse)	0	1	1	100.0

(Stage of disease not recorded in one patient who recovered.)

[1] Recovered from cholecystitis before death. No operation.

[2] Neither patient was operated on. Autopsy only in second case; this showed no peritonitis, and that death was due to pneumonia.

[3] Operation by Dr. G. G. Davis. Perforation of gall-bladder found postmortem.

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DISCUSSION.

Dr. J. Alison Scott: I think Dr. Ashhurst is to be congratulated not only upon his diagnosis, but upon his surgery. The diagnosis of perforated gall-bladder conditions in typhoid fever is not easy to make, because it is certainly a very rare condition; its differentiation from perforation must be difficult. In a good many thousand cases of typhoid fever I have never yet seen a case in which I have been satisfied as to a perforated gall-bladder. Two years ago there occurred, under the care of Dr. Stengel and myself, a case in which the condition was suspected, but the case died and no autopsy was allowed.

A CASE OF SARCOMA OF A RETROPERITONEAL UNDESCENDED TESTIS STRANGULATED BY A TWIST.[1]

By ROBERT G. Le CONTE, M.D.

The following case seems worthy of record on account of its extreme rarity, for I can find but two similar cases in recent literature, and because it is another pathological condition found in the right iliac fossa which may be mistaken for acute appendicitis:

P. P., Italian, aged twenty-eight years; single; laborer; was admitted to the hospital April 5, 1907.

He had lived in this country for four years, and had been in good health until ten days before admission, when he complained of pain in the abdomen, anorexia, nausea, feverishness, and extreme nervousness. Three days before admission the pain became very severe, confining him to bed.

The meagre history is owing to our limited knowledge of Italian and the patient's inability to speak English.

His temperature was 100.2°; pulse, 96; respiration, 22. The face was flushed, tongue coated, heart and lungs negative.

Urine contained a trace of albumin.

Examination of the abdomen revealed general tenderness, especially in the right iliac fossa, where there was a sense of tumor. Rigidity was marked over the whole abdomen, but was board-like in the lower right quadrant. The penis was normally developed, but the scrotum and inguinal canal were without testicles.

A leukocyte count was not made, as he was operated upon within an hour of his admission to the hospital.

Diagnosis. Diffuse peritonitis of appendicial origin.

Immediate operation was advised and accepted.

An incision was made through the lower portion of the right rectus, and on

[1] Read November 6, 1907.

opening the peritoneum some bloody, cloudy fluid exuded. An ovoid tumor, blue black in color, the size of an orange, immediately presented. It resembled in appearance a small, strangulated ovarian cyst with a thickened tube drawn over its surface. There was a moderately thick, ribbon-like pedicle which was attached to the retroperitoneal structures, perhaps two inches above the right inguinal ring, the attachment being two inches long, and the tumor twisted on the pedicle with two half-turns. Traction on the tumor produced a ridge in the retroperitoneal tissues, which extended to the right internal inguinal ring, and tended to draw the ring toward the pedicle. A fainter ridge was also produced leading to the left inguinal ring crossing the spine just above the peritoneal reflection on the bladder. A search in the abdomen did not reveal the left testicle.

The tumor was brought out of the incision, the pedicle untwisted, transfixed, ligated, and the mass cut off. The incision was closed, a small cigarette drain being left in the lower angle.

The diagnosis was revised to ectopic testicle strangulated by a twist.

Convalescence was uneventful.

A brother stated that the patient had some of the characteristics of a eunuch.

The following pathological report was made by Dr. E. L. Crispin:

Gross Description. The specimen consists of a dark-red fluctuant tumor mass measuring 13 x 8 x 8 cm. and weighing 410 gm. It is somewhat kidney-shaped, with a small nodule at the upper pole. On the concave side there is a tough mass, 3 x 5 x 2.5 cm., attached by a broad base. From the end of this there is a cord-like structure thicker than a pencil and 4 cm. long, lying on and attached by one side to the larger mass. Above the smaller mass, and lying partly over its upper surface, is a tough, cord-like tissue extending from the upper end of the small mass to the lower end, and measuring 9 cm. in length. The whole tumor mass is covered by a thin, smooth membrane in which large veins may be seen. Posteriorly this membrane from the larger mass extends smoothly over the smaller masses. Anteriorly it follows the convolutions, outlining these smaller masses. The large mass is quite fluctuant; about the middle anteriorly there is an area about 4 cm. in diameter, in which the tissue is thicker and fairly firm to palpation. There is a fibrous tag attached to the surface over this area. The smaller mass is quite tough and fleshy. The entire mass resembles somewhat a pus tube and ovarian cyst. On section 150 c.c. of dark fluid blood escapes from the numerous cyst pockets. The entire tissue is glistening, black, and extremely soft and friable.

There are large areas in which there are thin, whitish, wavy strands of diffluent blood-stained, gelatinous substance. The cysts contain a smooth-walled lining membrane. The wall of the larger mass is very irregular, being very thin in some of the cysts, though the tumor is solid through the tougher areas described. The smaller mass on section shows a black tissue extremely vascular,

quite tough, not friable, and in which white strands of connective tissue can be seen, also many vessel lumina with clots. The superior cap-like, fibrous mass is reddish for about 2 cm. from the surface. The central tissue is so deeply blood-stained that its structures cannot be made out. In the midst of this is a raised area of softer tissue resembling very much a cross-section of a Fallopian tube. A lumen cannot be found with a small probe. The fibrous ridge attached to the main mass beyond the smaller mass looks the same, except for the absence of the duct-like arrangement of the tissue. Above the smaller tumor mass, on the superior fibrous layer, is a small fibrous cord 1 cm. in length, which breaks loose from its attachment with slight traction.

Microscopically. The tumor is composed of great masses of aberrant cells. This tissue is greatly engorged with blood and in many places degenerating. The tumor cells are large and round, with dark-staining nuclei, and are of embryonic connective-tissue type. In places there is so much engorgement and degeneration that only the larger cell outlines in masses of blood, can be made out. In the less engorged and degenerate portions, where the cells are clearly defined, the tissue is seen to be composed entirely of large, round, sarcoma cells. Sections of the cord-like process described in the gross as resembling cross-section of Fallopian tube show a fibroid tissue greatly distended and packed with red blood cells. The vessels walls are thickened, and among the red blood cells in the lumina are many large, round, sarcoma cells. Scattered all through the extravasated blood in the section are polymorphonuclear cells and nuclear fragments. In the middle of the section are many small tubular-like areas surrounded by connective tissue, and having a cellular lining in which the small, dark-staining nuclei only can be made out. These, in their arrangement and appearance, are similar to the tubules of the epididymis. Sections through the fibrous cord running from the smaller tumor mass along the side of the greater are likewise so distended with blood and so degenerate that the central portions show only clot. The periphery, however, is composed of fibrous tissue which is very vascular, the vessels showing a considerable degree of endarteritis. All the vessels are engorged with blood. Sections from the greater curvature of the tumor show a fibrous wall greatly infiltrated with round and polymorphonuclear cells. The vessels are engorged and there are hemorrhages into the connective tissue. Below the fibrous wall there are large alveolar-like groups of large, round, sarcoma cells. There are also irregular areas of these sarcoma cells all through the fibrous framework of the tissue. There are proliferating fibroid cells all through the stroma. Some of these have extended into the vessels in attempts to organize. Everywhere there are infiltrating round cells. In many places these form a circular layer about the vessels. Much of this tissue is so degenerate that the cells are poorly stained. Other sections from the greater curvature of the tumor show semi-necrotic, pink-staining masses of large, round cells in which the nuclei have entirely disappeared.

Everywhere through the sections are seen masses of blood and fibrin in the sarcomatous tissue. Section through the smaller mass shows about the same picture. In this there is a fibrous wall filled with hemorrhages and greatly infiltrated with polymorphonuclear and round cells. Beneath this fibrous wall there are large groups of sarcoma cells. The meshes of the connective tissue about them are greatly distended with blood and fibrin, in which there are young connective-tissue cells. The nuclei of the aberrant cells here are very irregular in size and staining properties. There are no recognizable areas of gland tissue to be found in the sections.

Diagnosis. Large, round-celled sarcoma of engorged and degenerating tumor, which is probably an undescended testicle.

I can find but 2 cases in the literature of sarcoma of an abdominal testicle strangulated by a twist. The first was reported by Gerster (*Annals of Surgery*, 1898, vol. xxvii, p. 649). This was in a man, aged twenty-one years, who was taken ill the day previous to his admission to the hospital with frequent vomiting, fever, pain in the right iliac fossa sudden in onset, with a tumor The patient had a hypospadias of the third degree, and neither testicle had descended. At the operation the tumor removed proved to be the right testicle, which was the seat of a sarcomatous degeneration and had become twisted on its pedicle. The left testicle, which was still in the abdomen, appeared to be normal in size and shape, and bore some resemblance to an ovary.

The second case was from Hochenegg's clinic in Vienna, reported in *Wien. klin. Woch.*, March 14, 1907, vol. xx, No. 11. The man was an instructor, aged thirty-eight years, the father of six living children. He had been troubled for seven months with severe intermittent pain in the lower left abdomen—so severe that four days before admission to the hospital he was confined to bed. During the intermissions of pain the patient had noticed a tumor in the left iliac region, and seven weeks before admission he noticed an increase in the size of this tumor. The abdomen was opened and a mass weighing 1100 gm. was removed. The pedicle was attached to the retroperitoneal tissues in the left iliac fossa, and had a half-twist in it. Microscopic examination proved the tumor to be a testicle which had undergone alveolar round-celled sarcomatous degeneration.

It is a pity that in the case I have just reported the tumor was so greatly disorganized by the infarction that recognition of any testicular tissue was impossible, so the diagnosis is only reasonably certain. As a careful search in the abdomen for the left testicle did not reveal this organ, the possibility is suggested of the two testicles having been fused, one of them having undergone sarcomatous degeneration, while the other remained in an undeveloped or rudimentary condition. The absence of any other body like a testicle, together with the fact that the tumor evidently had attachments which led to both inguinal rings, might make this hypothesis tenable.

The subject of undescended testicle is too broad to be more than touched upon in this short communication, but it would seem expedient to discuss, in connection with this case, two conditions which were present, viz., strangulation of the organ and malignant degeneration.

1. *Strangulation.* Nearly all organs of abdominal origin are liable to rotation and twisting of the pedicle, but, as Scudder has pointed out (*Annals of Surgery*, August, 1901, p. 234), strangulation of the testis cannot occur in the normal organ. He shows that one of the essentials to twisting is a long mesocorium. In the embryo, as the testicle lies at the back of the abdomen, the mesocorium is comparable to the mesentery, only it is much thicker and acts as a suspensory membrane for the epididymis. It contains the nutrient vessels of the testes and epididymis. If the testis develops normally this membrane disappears, and its place in adult life corresponds to the space that is not covered by the tunica vaginalis where the vessels enter the testicle and epididymis.

According to Bramann (*Archiv f. Chirurgie*, vol. xl, p. 137), the testicle has more or less incomplete fixation in all anomalies of its development, and in all disturbances of its descent. In nearly all anomalies in the descent of the testicle the mesocorium is lengthened. This is explained in the following way: The processus vaginalis develops normally, and, owing to the delay in the descent of the testicle, the changes which would normally take place in it do not occur, and it remains a comparatively large cavity. When the

testicle finally descends it hangs in this cavity, and as it grows drags down the cord until, by the time it reaches the bottom of the sac, there is a long mesocorium. Scudder states that in all recorded cases of torsion of the cord operated upon a deformity or some delay in development or some abnormal condition about the testicle has been found. In 47 per cent. of the cases of torsion which he collected, the testicle involved was undescended, lying within the inguinal canal, or, but partially descended, lying close to the external abdominal ring. In every instance there was a long mesocorium. It would, therefore, seem that the overgrowth or lengthening of the mesocorium is the predisposing cause in strangulation of the testis. As the exciting cause the same factors which produce strangulation of an ovarian cyst or pedunculated fibroid would operate on the intra-abdominal testis with a long mesocorium; while in a partially descended testicle traumatism or unusual muscular contractions in the neighboring muscles could produce the twist.

2. *Malignant Disease.* Practically all the writers upon this subject during the last century are of the opinion that an arrested testicle is a source of danger to its possessor on account of its liability to sarcomatous degeneration. This opinion is firmly fixed in the professional mind.

On the other hand, Eccles (*Lancet*, March 1 and 15, 1902, pp. 569 and 722) has made a study of a great number of cases, and has concluded that there are not sufficient grounds for the belief that sarcoma is of more frequent occurrence in imperfectly descending testicles than in the normal organ. As we have no means of judging of the frequency of undescended testicle, because statistics on this point are not obtainable, we cannot get a just estimate on this subject. Testes which may be undescended at birth frequently come down to their normal position within the first year, and if not then they may do so sometime before puberty. Therefore, statistics which would report the frequency of undescended testicle at birth, or at the end of the first year, would vary greatly and would not hold true for later periods in life. The statistics of Marshall, quoted in Kocher's *Surgery*, show that in an examination of 10,800 recruits he found 12 cases of undescended testicle, 1 to 900, but

as Odiorne and Simmons (*Annals of Surgery*, December, 1904, p. 965) have pointed out, such statistics are inaccurate, for many men, recognizing the fact that they were imperfect in this respect, would not apply for the army. To contrast the percentage of malignant changes in the undescended testis with the percentage of malignancy in the normal testicle is, therefore, impossible.

There are, however, certain microscopic differences that are almost invariably noted in the undescended testicle, which would lead one to believe that the views of the older writers are correct in that such an organ is more liable to malignant change. Odiorne and Simmons have summed up these histological differences as follows:

The tunica albuginea is thick, sometimes as much as five times thicker than in the normal organ. The basement membrane of the tubules is also much thickened, and in many sections the lumen of the tubules is destroyed or represented only by a mass of dense, fibrous, hyaline tissue. The epithelial lining of the tubules also shows marked deviation from the normal, and the interstitial cells, one of the most striking features of the undescended testicle, are present in very large numbers. These cells are normally seen in small numbers in the testes of children, but disappear about puberty and are not found in the adult organ. In the undescended testicle the reverse is true, and large numbers of the cells are always present. If, therefore, we have an organ which remains in part in a more or less embryonic state, and which by its misplacement is rendered more vulnerable to traumatism, for the normally placed testicle is admirably adapted to escape injury, it is not difficult to believe that such an organ would be more liable to undergo malignant degeneration than the normal organ. In a series of 54 cases of malignant disease of the testicle at the Massachusetts General Hospital during a period of twenty-six years, 6 cases were in arrested testicle, *i. e.*, 11 per cent. Schädel stated that in one of the London hospitals there were 41 cases of malignant disease of the testis seen in one year, 5 of which were in undescended testicles, *i. e.*, 12 per cent.

Malignant disease of this organ is extremely rare in children, and uncommon before the twentieth year of life. It is most often noted in the inguinal form, but it is almost as frequently seen in testes

which have been retained in the abdomen. It would, therefore, seem that trauma does not play a very important part in the production of malignant changes, for surely the intra-abdominal testes are as well protected as any organ can be. I would, therefore, judge that if the misplaced organs are more frequently the seat of malignant change, this is due to the histological differences in the tissues from the normal, and, perhaps, as has been suggested, to the very large number of interstitial cells present.

DISCUSSION.

Dr. William L. Rodman: I am surprised to learn that such lesions are so very rare in the literature. It has just happened to me that in the last two weeks I have operated upon 2 cases of retained testis. In one the symptoms were such as to lead one to suspect that twisting of the pedicle might have occurred had the testis been a little higher up. I made an attempt after Bevan's method to bring the testis down to the scrotum. It could not be done, and was sacrificed.

Dr. Le Conte speaks of the rarity of sarcomatous change in retained testes in children. I have seen 2 cases: one a particularly sad one, the only child of a doctor. It has always been an impression with me that retained testes are particularly prone to undergo sarcomatous change. I think it is a safe thing in these small, imperfect, and practically functionless testes to sacrifice them unless they can be brought well down into the scrotum. I am distinctly under the impression that they tend to sarcomatous change sooner or later, and therefore are a menace.

THE LIVER IN ANTIQUITY AND THE BEGINNINGS OF ANATOMY.[1]

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Medicine—as is well known—is an offshoot of religion. The first teachers of mankind were priests, and included in the functions of the priest in primitive conditions and in early civilizations, we find on the one hand, that of lawgiver and judge, and on the other, that of diviner and healer of diseases. All knowledge in the infancy of civilization, as it was acquired, was put in the service of the cult. There was no science outside of religion, and even the arts—music, dancing, painting, sculpture—were in their origin allied to religion, and only gradually cut loose from being merely parts of religious ceremonialism or adjuncts in the worship of the gods.

The predecessor of the physician as healer is the priest as exorciser, engaged in the endeavor to drive out of the human body the demons who were regarded as the source of disease. These "demons"—invisible to the naked eye—were the precursors of the modern "germs" and "microbes," while the incantations recited by the priests are the early equivalents of the physician's prescriptions. There were different incantations for different diseases; and they were as mysterious to the masses as are the mystic formulas of the modern physician to the bewildered, yet trusting patient. Indeed, their mysterious character added to the power supposed to reside in the incantations for driving the demons away. Medicinal remedies accompanied the recital of

[1] Read November 6, 1907.

the incantations, but despite the considerable progress made by such nations of hoary antiquity as the Egyptians and Babylonians in the diagnosis and treatment of common diseases, leading in time to the development of an extensive pharmacology, so long as the cure of disease rested with the priests, the recital of sacred formulas, together with rites that may be conveniently grouped under the head of sympathetic magic, was regarded as equally essential with the taking of the prescribed remedies.[1]

Complementary to the function of the priest as exorciser in driving ills out of the body, we find, in primitive times, the priest acting as diviner in order to forestall by his ability and skill in forecasting the future, the ills and misfortunes threatening the country or the individual. Divination in some of its aspects might be called the "preventive medicine" of antiquity, and if the priest as exorciser represents the source of practical medicine, it is through divination that we are led to the beginnings of anatomy—as an adjunct to medicine.

Through the application of a curious theory as to the seat of life in men and animals, the priest as diviner becomes a student of animal anatomy.

Divination covers a wide scope in all religions of antiquity, both primitive and advanced. The desire to tear the veil from the face of the unknown future is an impelling factor in all religions, which is accentuated in the more primitive cults by the fear of the unknown. We may distinguish in divination two broad divisions, which may be designated as involuntary and voluntary. Involuntary divination deals with the endeavor to interpret signs that are forced on our attention, that come as it were independently of our volition, and that, therefore, were regarded as fraught with some special significance. To this class belong dreams, unusual or peculiar occurrences, the birth of monstrosities among men or animals, and all the little mishaps or specially significant inci-

[1] As a survival of the primitive belief in the power supposed to reside in sacred words and formulas, it is said that it is not uncommon for the *fellahs* of Egypt, when ill, to swallow the written prescription as well as the medicinal dose

dents of life. Most important of all, however, are the signs furnished by the phenomena of the heavens, the movements of the planets, the phases of the moon, the action of the sun in its course along the heavens, and, naturally, such occurrences as storms, the play of lightning, rain out of season, eclipses, and so forth. From the observation of the heavenly bodies there arose the science of astrology, based on the belief that the movements of the planets and stars, which were identified with specific gods, represented the activity of the gods in preparing the events that were at their bidding to take place on earth. There was supposed to exist a complete parallel between what occurred in the heavens and what subsequently manifested itself on earth. Hence, the theory which, when once developed, retained its hold tenaciously upon mankind down to the threshold of modern days, that if one could read the stars one would know what the future had in store.

By voluntary divination I mean the deliberate seeking for some sign or for signs that by a more or less developed system of interpretation would furnish an answer to an inquiry with regard to the future. The sign in question is not one that comes involuntarily, forced on one's attention through circumstances beyond our control, but which is deliberately sought out. We might call the signs of involuntary divination, portents, and those of voluntary divination, omens. Thus, when the question arises whether a king should lead his army to battle on a certain day, and in order to reach a decision, arrows are thrown before the deity,[1] and according as they fall the priest would read the statue or symbol of the patron answer of the god—we have an instance of the second division of divination lore. Taking a bowl of water into which some drops of oil are poured, and then noting the action of the oil bubbles, would be another instance of voluntary divination.[2]

[1] Practised among the ancient Arabs.

[2] Found in Babylonia and among the Persians. See Hunger, Beecherwahrsagung bei den Babyloniern (Leipzig, 1903). The "cup" of Joseph described in Genesis 44: 2, 5, and 15, as used for divination purposes,

The most common method of voluntary divination widespread in antiquity was through the inspection of a sacrificial animal. There was one organ of the animal specifically singled out as a means of divining the future, namely, the liver. The custom of divining through the liver of an animal specially set aside for the purpose belongs to the primitive stage of religion, as is vouched for by its occurrence among the native population of Borneo, Burma, Uganda, and elsewhere.[1] In Borneo a pig is the ordinary animal of sacrifice, in Burma a fowl or a pig is used, while in Uganda the livers of goats are the ones usually chosen. The custom was, however, carried over into higher stages of civilization, and we find it as an integral part of the cult among the Babylonians and Etruscans,[2] as well as among the Greeks and Romans,[3] while traces of the theory underlying the rite are encountered among the Hebrews and Arabs, as well as in India and China.[4]

To be sure, among the Romans other organs, as heart and lungs, were examined besides the liver, but this appears to have been *in later days*,[5] and even then the references to divination through the inspection of the heart are few, while the references to the

falls within the category of "oil and water" divination. It may be of interest to note that "oil" divination is still practised at the present time. I am told that among certain classes of Italians—more especially among those from Sicily—in Philadelphia, after a doctor has been called in and prescribed for a patient, the members of the family take a bowl of water, pour some oil in it, and if the bubbles pass to the right it is believed that the patient will recover, but if they pass to the left that he will die.

[1] See the references in Blecher, De Extispicio (Giessen, 1905), pp. 73–74, and in the author's Religion Babyloniens und Assyriens, ii, p. 216.

[2] For the Babylonians, the details, with copious translations of "liver" divination texts, will be found in the author's Religion Babyloniens und Assyriens, ii, chapter xx; for the Etruscans, see Bouché-Leclerq Histoire de la Divination dans l'Antiquité, iv, p. 68 seq., and Thulin, Etruskische Disciplin, ii (Göteberg, 1906).

[3] For the Greeks and Romans, see Blecher, De Extispicio

[4] See the author's work, ii, pp. 217 and 231.

[5] Pliny, in his Natural History, xi, §71, states that the first time that the heart was examined in a divination rite by the Roman soothsayers occurred in the 126th Olympiad, which corresponds to the year 274 B. C.

lungs are still rarer.[1] As a matter of fact, although the Greek and Roman historians and essayists, when speaking of divination, make use of the general terms *iera* ("victims") or *iereia*, "sacred parts," and *exta*, "entrails," respectively,[2] when specific instances of divination through the inspection of the sacrificial animal are referred to, they always involve parts of the liver or markings on the liver or they refer to the gall-bladder, which, lying on the liver, was regarded as an integral part of it. We may, therefore, dismiss the consideration of other organs and bear in mind once for all that the liver is, as Bouché-Leclercq puts it, "the organ of revelation *par excellence*."[3]

The theory underlying this curious rite is a very simple one. The liver was in early days universally regarded as the central vital organ in the animal, the seat of all forms of mental and emotional activity, or, in other words, as the seat of the soul. We have been accustomed to think that the heart was, among ancient nations, looked upon as the seat of the soul, but while this is true for Greece, Rome, and India, as well as for the Hebrews at a certain stage of culture, even in these civilizations there was an earlier period in which that distinction was accorded to the liver. A trace of this earlier view is to be found in the use of the word for liver in Greek (*hēpar*), which is applied in Greek poetry as the word "heart" is in prose.[4] So when a person is mortally wounded, he is spoken of as "struck in the liver." The punishment of Prometheus, whose liver is gnawed by a vulture, also rests on this primitive view. The liver is singled out because it is the seat of life. In Hebrew poetry, likewise, the word for liver (*kabed*) is used synonymously with the word for soul (*nefesh*), and even as late as the days of Mohammed the story is told that on an occasion of great sorrow the prophet wept all night "as though his

[1] Thulin, in his Etruskische Disciplin, ii, p. 23, gives only six references to divination through the heart and only three references to the lung—all of them late and of an indirect character.

[2] See the passages in Blecher, De Extispicio, pp. 3–22.

[3] Histoire de le Divination, iv, p. 68.

[4] See Stephanus, Thesaurus Linguæ Græcæ, under *hēpar*. See for Hebrew usage, Lam. 2 : 11 and Proverbs 7 : 23.

liver would crack," where we would say, "as though his heart would break."[1]

This position accorded to the liver in antiquity must not be confounded with the current popular notion which supposes the liver to be the source of the lower emotions, as jealousy, malignity, ill-humor, or timidity. Such a view represents the degradation of the liver from the high position it once occupied as the seat of the intellect and of *all* emotions, the higher ones—as love and courage—as well as the lower ones. The liver as the seat of the soul becomes practically identical with what, in the common view, was regarded as the soul. It is to this stage that the practice of divination through the liver of the sacrificial animal reverts.

The question may, however, be asked, How came people to the belief that through the soul of an animal the course of future events could be determined? A brief consideration of the views held in antiquity as to the nature of vitality and as to the nature of gods will make the connection between the liver and divination clear. Life of all kind was held as sacred by ancient nations, and was everywhere regarded as due to the gods. To such an extent did this view prevail that the manifestations of life, whether among animals, trees, or rivers, were often identified with the gods. The distinction between the symbol and the thing symbolized was not sharply maintained; hence, the animal becomes the manifestation of the god; the tree, which also gives evidence of some form of life within it, is a local habitation for a god; while the river is, as one views it, the habitat of the god or the god himself.[2]

The life or soul, as the seat of life, in the sacrificial animal is, therefore, the divine element in the animal, and the god in accepting the animal, which is involved in the act of bringing it as an offering to a god, identifies himself with the animal—becomes, as

[1] My friend and colleague, Prof. Torrey, of Yale University, kindly called my attention to this reference in Arabic literature. See Krehl, Recueil des Traditions Musulmanes, ii, p. 156; Torrey, Selections from the Sakhikh of Buchari, p. 38.

[2] See chapters xvi and xvii in Jevon's Introduction to the History of Religions (London, 1896).

it were, one with it. The life in the animal is a reflection of his own life, and since the fate of men rests with the gods, if one can succeed in entering into the mind of a god, and thus ascertain what he purposes to do, the key for the solution of the problem as to what the future has in store will have been found. The liver being the centre of vitality—the seat of the mind, therefore, as well as of the emotions—it becomes in the case of the sacrificial animal, either directly identical with the mind of the god who accepts the animal, or, at all events, a mirror in which the god's mind is reflected; or, to use another figure, a watch regulated to be in sympathetic and perfect accord with a second watch. If, therefore, one can read the liver of the sacrificial animal, one enters, as it were, into the workshop of the divine will.

Now, whether one accepts the theory here set forth or not, so much is certain that we must look for some *rational* view underlying a custom that, in the case, *e. g.*, of Babylonia and Assyria, prevailed for a period of about 3000 years. The system devised for the interpretation of signs to be seen on the liver would never have survived during so long a period without some theory that commended itself to a people of such notable achievements as the Babylonians and Assyrians. A system built up on a foundation of caprice and arbitrariness would not have lasted. It would either have had its outcome in deliberate fraud or it would have defeated its ends by revealing in time its own absurdities.

We are now approaching the point of interest to students of the history of medicine in this widespread rite of divining the future through the liver. The rite led in Babylonia, and no doubt, also among so highly civilized a people as the Etruscans to the *anatomical study* of the liver. Confining ourselves to Babylonia and Assyria, where the sources at our disposal are now very copious, and where divination through the liver can be traced back to the most ancient period of Babylonian history known to us—c. 3000 B. C.—we find this anatomical study betraying all the external symptoms of a scientific or quasiscientific study. The animal ordinarily used for sacrifice was the sheep, and we are now in a position to state that the study of anatomy begins with

the analysis of the sheep's liver as early at least as 3000 B. C. The parts of the liver to which, in divination rites, special attention was paid were the various lobes, the gall-bladder, the portal vein, the gate of the liver, the two appendages to the upper lobe (known as the *lobus caudatus*),[1] and to the markings on the liver lobes, due to the traces on the surface of the liver of the subsidiary gall-ducts that gather the gall from the liver into the gall-bladder and to the subsidiary vein ducts distributing the blood from the large portal vein through the liver. No two livers, naturally, presented the same phenomena—as little as two leaves of a tree—and the innumerable variations in the character of the lobes, in the gall-bladder and various ducts, and in the markings on the liver furnished a boundless field across which the fancy of the divining priests could roam at will.

The Babylonian priests, thus led to the study of animal anatomy, prepared clay models of the sheep's liver to be used as object lessons for the instruction in the temple schools to the aspirants to the priesthood. A model of this kind now in the British Museum, and belonging at one time probably to the school in the temple of Marduk, in the city of Babylon, dates from the period of Hammurabi (c. 2000 B. C.).[2] It shows the parts of the liver distinguished, and from the omen texts themselves we learn the designations given to these parts. Let us see how far this anatomical study went. The right and left lobes were naturally distinguished, and, corresponding to the modern terms *lobus dexter* and *lobus sinister*, they were designated as "the right wing of the liver" and "the left wing of the liver" respectively. Whether the right lobe was further separated by them, as in modern anatomy,

[1] Formerly known as the *lobus Spiegeli*. I follow the nomenclature proposed by Stieda for the various parts of the liver in his paper on "Die aeltesten bildlichen Darstellungen der Leber," in Bonnet-Merkel, Anatomische Hefte, Band 15, p. 695.

[2] Published in Cuneiform Texts from Babylonian Tablets, etc., in the British Museum, Part 6 (London, 1898), Pl. I. The illustration is also found in Boissier, Note sur un monument Babylonian se rapportant à l'Extispicine (Geneva, 1899), and in Thulin, Etruskische Disciplin, ii (Göteberg, 1906), Pl. II, as well as in Stieda's article referred to in the preceding note. (See Fig. 1.)

by the groove in which the gall-bladder lies (*fossa sagittalis dextra* or *fossa vesicæ fellcae*) into the *lobus dexter* proper and the *lobus quadratus* is uncertain, but it would seem not, though the omen texts do furnish a designation for this groove, which was called "the river of the edge of the liver," to distinguish it from the umbilical groove (*fossa sagittalis sinistra* or *fossa venæ umbilicalis*) separating the left lobe from the *lobus quadratus*, and which was called the "river of the liver," without further specification. The fourth lobe at the upper part of the liver known as the *lobus caudatus* was appropriately termed from its position "the middle of the liver." Attached to this lobe are two appendages, a larger one at the right end, for which Stieda proposes the name *processus pyramidalis*, while the smaller at the left end is called the *processus papillaris*. The larger appendix has the distinct outlines of a finger, and was, therefore, called "the finger of the liver," or, more fully, "the finger of the middle lobe,"[1] while the smaller one was designated by a sign which appears to have the meaning of "offspring" or "small." The gall-bladder (*vesica*) bore the very appropriate name of "the bitter" part, the cystic or biliary duct (*ductus cysticus*), into which the gall-bladder issues, was

[1] It is of interest to note that in the Pentateuchal codes a phrase which in literal translation reads "that which hangs over the liver," and which is generally rendered the "caul above the liver," occurs ten times (Exodus 29: 13 and 22; Leviticus 3: 4, 10, 15; 7: 4; 8: 16 and 25; 9: 10 and 19). It is the Hebrew equivalent for this "finger" of the liver. The proof for this was furnished by Prof. George F. Moore, in a paper published in the "Noeldeke Festschrift," p. 761 seq. The Rabbinical tradition correctly interpreted the phrase, as is indicated by the term "finger of the liver," used to describe this appendix in the later Hebrew literature. According to the passages in the Pentateuchal codes referred to, this part of the liver was to be burned in the case of the various kinds of animal sacrifices—sin offerings, guilt offerings, and peace offerings—and it seems a plausible conclusion that the reason for this ordinance was that the burning might serve as a symbolic protest against the use of the liver for divination purposes. The theory underlying animal sacrifice in the Old Testament is, that it serves as a tribute to the Deity or as an atonement, and since the spirit of all the Pentateuchal codes is firmly opposed to sorcery, incantations, and divination of all kinds, it is not surprising to encounter a provision which is intended to be a protest against the Babylonian view, that made sacrifice a means for securing the aid of a god in divining the future.

designated by a sign which in all probabilities means the *penis*, while the hepatic duct (*ductus hepaticus*), into which the biliary duct passes to the left, was called "the outlet." The designation is interesting as showing that the Babylonians believed that the gall passed from the gall-bladder into the cystic and hepatic ducts, whereas, as a matter of fact, the hepatic duct is really an "inlet," collecting the gall passing through the subsidiary ducts from various parts of the liver, to be finally brought into the gall-

FIG. 1.—Babylonian clay model of sheep's liver with a divination text of the period of Hammurabi (c. 2000 B.C.).

FIG. 2.—Bronze model of liver found near Piacenza in 1877, used in Etruscan divination (c. 3d century B.C.).

bladder for purification. On the right side the biliary duct leads to the common bile duct (*ductus choledochus*). The juncture forms a "yoke," which, accordingly, was the name given to this common bile duct. By the side of the hepatic duct lies the great portal vein (*vena portæ*), which the Babylonians called the "strong." It is not certain whether they specially distinguished the subsidiary veins, though a term "splits" frequently occurring in the omen texts may be intended as a description of these ducts. On

the other hand, the subsidiary hepatic ducts are distinctly referred to and appropriately termed "branches." Lastly, there is the transverse fissure of the liver above the left lobe, known as the liver gate (*porte hepatis*), and in which the hepatic duct and the portal vein wholly or in part lie. The Babylonians called this

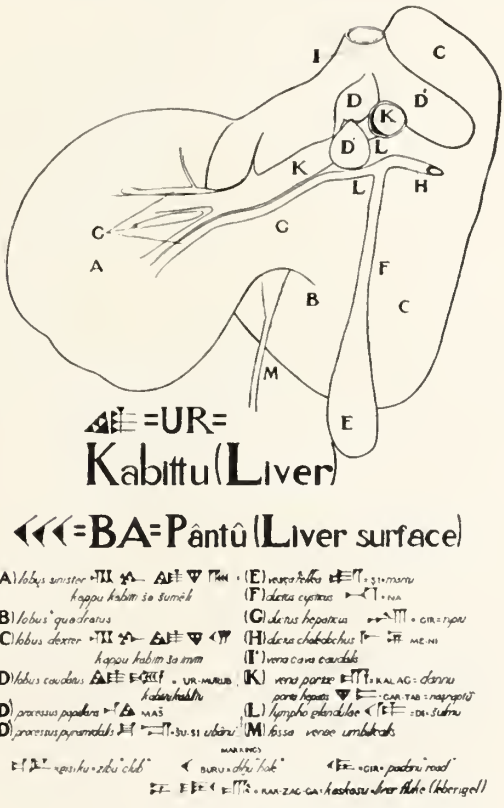

FIG. 3.—Diagram of sheep's liver, showing modern anatomical terms and their Babylonian equivalents.

depression on the surface of the liver the "crucible." For the *vena cava* connecting the liver with the heart I have not found the Babylonian designation, and it is doubtful whether it was taken into consideration at all. So much for the anatomical side of "liver" divination. (See Fig. 3.)

The play of fancy begins even before we reach the system devised for the interpretation of phenomena observed on the liver. The markings on the liver to which reference has already been made were combined to form all kinds of fantastic figures. The more simple of these markings were called "roads;" others, which appeared to be depressions, were known as "holes," but even more commonly these markings were fancifully combined to form various kinds of weapons or parts of weapons. The gods of Babylonia and Assyria are often symbolized on so-called boundary stones by weapons associated with them,[1] and, because of this association, markings on the liver that seemed to bear a resemblance to such weapons were connected with various gods and goddesses, and an interpretation was given to these markings which accorded with the attributes of the deity in question. A marking, *e. g.*, connected with the weapon of Ninib—a storm god—was interpreted as pointing to some event in which Ninib would manifest his power, either as an ally or as a hostile force; a weapon associated with Ura—the plague god—would point to sickness; the weapon of Ishtar—the chief goddess of the Babylonian-Assyrian pantheon—would prognosticate, according to further indications, the favorable or unfavorable activity of that goddess; and so through the long list of the pantheon.

In order to reach a decision as an answer to any given question, all the signs and phenomena noted on the liver were recorded, the meaning of each determined whether it was favorable or unfavorable, and then, by a combination of the prognostications a conclusion was reached whether a proposed undertaking, a battle, a journey, a proposed appointment to an official post should be risked, or whether the outcome of a disease or an occurrence of some kind would be favorable or unfavorable. The general principle underlying the elaborate system of interpretation that was in the course of time developed, rested on a more or less natural and logical association of ideas. If a certain sign on the right side was favorable, the same sign on the left side was usually

[1] See Dr. W. J. Hincke, "A Boundary Stone from Nippur of the Days of Nebuchadnezzar I," Introduction (Phila., 1907).

unfavorable. Most of the interpretations bore on public events, but could be applied also to private affairs. Thus, if the gall-bladder was swollen on the right side, it pointed to an increase in the strength of the king's army, and was, therefore, interpreted as a favorable sign in general; while the swelling on the left side prognosticated the success of the enemy, and was, therefore, an unfavorable sign. If the gall-bladder lay tightly embedded in the gall-bladder groove, it meant, if on the right side, that the king's army would be in the firm grasp of the enemy, and, therefore, to be regarded as an unfavorable symptom; if, however, the left side of the gall-bladder was tight, that the enemy would be kept as a prisoner, and, therefore, a favorable symptom for the king's army. If the biliary duct was long, it pointed to long life; if the hepatic duct was well enclosed in the gate of the liver, it meant success in battle; if, however, it lay above and beyond the hepatic duct, it indicated a position exposed to the attack of the enemy. If the finger-shaped appendix (*processus pyramidalis*) was broad, it was interpreted as joy; if it was small, while the other appendix—usually small—was large, it pointed to an inversion of the natural order. The son would be mightier than the father, the servant would prevail against his master; *i. e.*, in general that the "small" would be great and the "great" submit to the "small." Gallstones, designated as "knots," are also not infrequently mentioned in the divination texts, and in connection with other symptoms are either favorable or unfavorable. These few examples illustrating the general character of the system of interpretation will suffice for our purposes. It will be apparent how in this way, on the basis of an endless series of examinations of the livers of sacrificial animals, an almost endless series of signs and phenomena would arise, while the interpretations based on the general principle here set forth, and reinforced by the records of the actual events that followed on the occasions when the auspices were taken, would grow in equal proportion to the observations made. The signs and the interpretations were gathered by the scribes attached to the various temples into hand- and reference-books, which would serve the double purpose of guides for the

interpretation of omens, and of text-books for instruction in the temple schools. One can easily imagine the huge proportions assumed by the system of hepatoscopy in the course of many centuries.

That practically the same system was followed by the Etruscans, Greeks, and Romans is apparent from the references in Greek and Roman writers. For the Etruscans, we have as confirmatory evidence of these references the model of a sheep's liver in bronze, dating from about the third century B. C., and which was found near Piacenza (Italy) in 1877.[1] On this bronze liver the same parts of the liver as in the case of the Babylonian clay model are indicated, even to the markings on the livers, which are somewhat conventionally represented by lines converging to a single focus. Indeed, the resemblance of this bronze liver of Etruria to the Babylonian counterpart is so close that it is hard to resist the conclusion of a connection between the two. There are many indications which point to the East as the home of the Etruscans, and the development of elaborate systems of hepatoscopy among both Babylonians and Etruscans would seem to be a definite link connecting the two civilizations; and since the Babylonian culture is by far the older of the two, it would seem to be a further reasonable inference that the Etruscan system is dependent upon the Babylonian. At all events, it is the development of an elaborate system of interpretation that has in both instances brought about the incorporation of hepatoscopy as an integral part of the religious cult, and that led to the continuance of the rite throughout all the changes of an advanced and advancing civilization. Without this system, liver divination would have died out, or at best survived as a superstition, *i. e.*, as a

[1] Now in the Museo Civico at Piacenza. Numerous monographs have been written about this remarkable object, the latest being a summary of twenty-five years of study of it by Prof. Körte. "Die Bronzeleber von Piacenza" (Mittheilungen des Deutsch-Archaeologischen Instituts, Römische abtheilung, Band xx, pp. 348–379). Illustrations of it will be found in the monographs of Blecher, Thulin, and Körte, above referred to. See also Thulin, Die Götter des Martianus Cappella und die Bronzeleber von Piacenza (Giessen, 1906). (See Fig. 2.)

non-official popular custom, as it died out in India, China, Judea, and other countries with the advance from primitive culture to higher planes of belief and religious practice.

Our knowledge of Greek and Roman hepatoscopy is unfortunately limited to incidental notices. We have not, as in the case of Babylonia and Assyria, copious omen collections and omen reports furnishing both the signs observed and the interpretations offered. That handbooks and such collections existed among the Romans we know from references in Livy, Cicero, and various other writers,[1] but they have not been preserved. We also have the direct evidence in Roman writers that the Romans took over their system of divination through the liver from the Etruscans, and up to a late day the augurs in Rome were generally imported from Etruria.[2] In the case of Greek hepatoscopy, the question whether it also reverts to Etruscan origin is still an open one, with indications rather in favor of assuming a direct connection with Babylonia and not through the mediation of Etruscans.[3] The anatomical nomenclature is not the same for Greek and Roman hepatoscopy; so, *e. g.*, the *processus pyramidalis*—the finger-shaped appendix at the right end of the caudate lobe—is known as ὁ λοβός, "the lobe" *par excellence* in Greek,[4] no doubt because of the important part that it played in divination; whereas, the Romans designated it as *caput jecoris*, "the head of the liver," which, likewise, points to the dominant position of that appendix in the system of interpretation. More important, however, is the proof furnished from references in Greek and Roman writers that the parts and signs on the liver that enter into consideration are the same as in Babylonian hepatoscopy. Thus, in the passage in the Prometheus of Æschylus (line 495 seq.), in which Prometheus, recounting among the benefits that he conferred on mankind the art of divining through the sacrificial animal, the gall-

[1] See the references collected by Thulin, Etruskische Disciplin, i, pp. 1–12.

[2] Cicero, De Divinatione, i, 2. See Thulin, l. c., ii, p. 4.

[3] See the author's Religion Babyloniens und Assyriens, ii, p. 320, note 3.

[4] In the Greek translation of the passages in the Pentateuchal codes above referred to, the Hebrew term for *processus pyramidalis* is correctly rendered as ὁ λοβός.

bladder and the *processus pyramidalis* are singled out as particularly significant, while in a passage in the Elektra of Euripides (line 826 seq.) the "gate of the liver"[1] is added. As in Babylonia, the enlarged character of the *processus pyramidalis*, so that it sometimes appeared to be "double," was a good sign, pointing to enlargement of power,[2] while the absence, real or apparent, of this appendix was an unfavorable symptom. So, again, the "black" color of the gall-bladder was an unfavorable sign, just as in Babylonian omen texts the "black" color always involved an unfavorable augury.[3] Finally, from glosses in Hesychius we learn that the Greeks, and presumably, therefore, also the Etruscans and Romans, gave fanciful designations, as did the Babylonians, to the markings on the liver. Among these designations we find terms like "twins"—probably for a double loop—"receptacle," "tongue," "hindrance," "opponent." The terms include one that may be translated "knot," and which involuntarily suggests the Babylonian designation of "gallstone" above pointed out.[4] The term "river" also occurs in the list, which reminds one of the Babylonian term for the two grooves of the liver. From Hesychius we also know that the four lobes of the liver were designated by fanciful terms, namely, "table," "hearth," "knife," and "driver." These terms were transferred from hepatoscopy into human anatomy and continued in use to the eighth century of our era.[5] Such terms, just because of their fanciful character, were well adapted for use in the divination rites, where the association of ideas was to so large an extent dependent upon supposed resemblances of parts of the liver and signs on the liver to certain objects. The origin of these terms is thus revealed, and, incidentally, they furnish a further proof for the thesis here maintained that the study of anatomy actually begins with the importance attached in divination to the liver of the animal offered up as a sacrifice.

[1] *pulai*, "gates," to which the modern term *porta hepatis* reverts.

[2] See the examples in Thulin, Etruskische Disciplin, ii, p. 31.

[3] For examples, see Jastrow, Religion Babyloniens und Assyriens, ii, p. 341, note 7.

[4] See above, page 129.

[5] They occur in Theophilus Protospathius' work, De Fabrica humani corporis, ii, 13 (p. 81 of Greenhill's edition, London).

Before leaving the subject, let me point out how, with the addition of other organs to be examined for the purpose of divining the future through them, the basis upon which the entire system of hepatoscopy rested was destroyed. I referred in the early part of this paper to the theory underlying hepatoscopy everywhere, namely, the belief, which at one time was general, that the liver was the central vital organ and as such the seat of the soul. As long as anatomy was attached to divination this view continued to be held, but when medicine cut loose from the leading-strings of religious observances, anatomy, too, became an independent science, and progress in the study led to assigning to the heart a much more important place than it had hitherto held in the common mind. As a result, the view gradually took shape which gave to the heart the place once occupied by the liver. This stage is reflected in the *current* use of the word heart in Greek prose, in Latin, in Hebrew, as well as in India[1] and elsewhere, and to such an extent, indeed, that, as we have seen, only sporadic traces of the earlier view survived. In this second stage the heart is not merely the seat of the emotions, but of the intellect as well. In the Old Testament, *e. g.*, the word *lebh* is not only used in this way, but is frequently employed as the synonym of *nephesh*, "soul, life," etc. Even in modern languages there are survivals of this second stage in the endeavor to localize the soul in some organ. We still speak of learning something "by heart," where heart is clearly used in the sense of "intellect." Similarly, in *recordare*, in the sense of "recalling," it is the heart which is assumed to be the seat of the intellectual activity involved. Ennius, who spoke three languages, is described as having "three hearts;" and more the like.[2]

[1] See Windisch, Ueber den Sitz der Seele, besonders bei den Indern und Griechen (Verhandl. d. Kgl. Sächs. Ges. d. Wiss., vol. xliii, pp. 155–194).

[2] See numerous examples in Andry, Recherches sur le Cœur et le Foie (Paris, 1858), pp. 1–30. I beg to call the attention of those interested in the history of medicine to this valuable (and almost forgotten) work, which contains a wealth of interesting material bearing on views held in antiquity—both popular and scientific or pseudoscientific—as to the heart and the liver. Most of the references furnished by modern writers are to be found in Andry, besides many others that have been overlooked by his successors. Had I known of this monograph in an earlier state of my researches, it would have saved me much time.

It was because of the general prevalence of this view that the Romans—and perhaps also the Greeks—added the heart to the liver in the inspection of the sacrificial animal for the purpose of divining the future; and this step being once taken, it was naturally followed by taking also the lungs and the "internals" in general into consideration. In taking this step, however, the basis of the rite was destroyed. The underlying theory of hepatoscopy being, as we have seen, the supposition that the liver was the divine organ in the sacrificial animal, which took on, as it were, the character of the "soul" of the deity to whom the animal was offered the *rationale* of the rite disappeared with the abandonment of the theory, and it is a common phenomenon in the history of religion that a religious ceremony degenerates into a meaningless superstition, and even issues in fraud, if the substratum on which it rests is disturbed. In Babylonia and Assyria, where for a period of several thousand years the liver was consistently employed as the sole organ of divination, there are no traces that the rite fell into decay or was abused by the priests. Indeed, we are rather astonished at the candor with which unfavorable decisions on the basis of the inspection of the liver of the sacrificial animal are rendered, and there are numerous instances of endeavors to ensure for one's self the correctness of the answer to the question propounded by repeating the inspection two or three times. If, therefore, among the Romans we find suspicion of the integrity of the priests issuing in the open declaration of deliberate deception, as instanced in the famous observation of Cato, that in his days two augurs could not meet without laughing,[1] we are justified in tracing this degeneration of the rite to the destruction of its basis by adding other organs to the liver. If the liver was not the seat of the soul, there was no reason for the rite, and with the disappearance of this belief it is not surprising to find such a strategy as is recorded in several classical writers of a ruler who, in order to encourage his soldiers to give battle, engaged a priest to write the words "victory to the king" on the palm of his hand, with the letters reversed, to put the smooth

[1] Cicero, De Divinatione, ii, § 24. See also Cicero, de Natura Deorum, i, § 26.

side of the liver of the sacrificial animal on his hand, make a pretence of examining it, and then to hold up the liver in the sight of the army with the miraculous inscription.[1] The tale well illustrates the degradation of the rite after the belief upon which it rested had disappeared.

The advance in the study of anatomy marked by Hippocrates (460–351 B. C.) and his school led to the full recognition of the functions of the brain, and in consequence we reach a third stage in which, owing to the predominating significance of intellectual functions in human existence, the disposition became pronounced to place the seat of life and even the soul in the brain. To be sure, Hippocrates himself betrays a trace of older views in making the liver the seat of the blood,[2] and since blood was always identified with life, this was merely a more scientific manner of stating that the liver was the vital organ *par excellence*. It is also worthy of note that Aristotle[3] clung to the second stage of belief, which placed the seat of intellect and of emotions in the heart, arguing that the heart as the noblest organ must also be the seat of the noblest functions, but the superiority of the brain over the heart and the liver gradually came to be a part of popular belief as well as an axiom of anatomical science. Plato (Timaeus, § 69–71) shows the influence of this change in the compromise he proposes between the older and modern views. He assumes that man has two souls, one immortal and divine, which he places in the brain and to which he assigns the intellectual activity as the highest function; the other, mortal, which he places in the breast, with the seat of the lower emotions, as jealousy, anger, the passions, and appetites, below the diaphragm, and the seat of the higher emotions, as courage, above the diaphragm. The chief organ below the dia-

[1] Polyænus Strategematon, iv, 20, ascribes this trick to a priest, Soudinos, whom he calls a "Chaldean"—meaning probably "diviner"—and who was in the service of King Attalus I, of Pergamos. Frontinus Strategematon, i, 15, tells the same story of Eumenes, the son of Attalus, and also (§ 11–14) of Alexander the Great.

[2] Fuchs, in Neuburger und Pagel, Handbuch der Geschichte der Medizin (Jena, 1902), i, p. 238.

[3] See De Partitione Animalium, ii, 10, and the other references in Windisch, l. c., pp. 171–171.

phragm is the liver; the chief organ above the diaphragm is the heart. The liver is thus degraded from the high and unique position it once occupied as the seat of the intellectual functions and of all emotions—the higher *and* the lower—to being the seat merely of the lowest emotions, and this position it still occupies in the popular usage of the present time, as is indicated in such phrases as "white-livered," in the sense of cowardly, "choleric" (from cholē = gall-bladder), for "passionate" and the like.

By the time that the view which gave to the brain the functions of soul-life had made its way into popular belief, the religious faith of Greece and Rome was too far advanced on the road to decay to permit of a further modification in the rite of divination. Greek philosophy had aroused a spirit of skepticism which gave to the current beliefs about the gods a blow from which the religion never recovered. In a skeptical age religion is apt to retire within its shell and to exhaust its energies in the effort to maintain what exists, rather than to branch out to new aspirations. Had the view which gave to the brain the position once occupied by the liver and subsequently by the heart come at a time when the prevailing religion was still in its full strength, we would have witnessed the addition of the brain to the organs of the sacrificial animal to be inspected with a view of divining the will and intentions of the gods. In phrenology, however, we have the expression —*outside* of the official cult—of this third stage of anatomical knowledge, and in so far as phrenology is still employed as a "quack" method of reading character, we may see in it a modified form of ancient divination. I am inclined also to see in chiromancy a link uniting the present to the ancient practice of divination through the liver of the sacrificial animal, since the reading of the lines of the hand appears to be merely the transfer to a more accessible part of the body, of the interpretation of the lines or markings on the liver, which, as we have seen, played so important a role in ancient hepatoscopy.[1]

[1] Perhaps a trace of the connection between "liver" divination and chiromancy is to be seen in the designation "line of the liver" given to one of the markings on the hand.

Be this as it may, I trust to have demonstrated the thesis of the close alliance between divination and the early history of anatomy—complimentary to the bond existing between incantation rites and the beginnings of medicinal treatment of disease. In divination through the liver of the sacrificial animal we have a practical and plausible motive leading to the study of animal anatomy; and the study once begun would by the impetus of men's curiosity lead in the course of time to its divorce from the cult. We may, perhaps, go a step farther. Anatomy passes by a natural process to surgery, and it would appear that in Babylonia, at least, the practice of surgery was the first branch of the general subject of medicine to cut loose from the bondage to religion and to the religious cult. In the Hammurabi code the eleven paragraphs (§ 215–225)[1] dealing with medicinal regulations, all are concerned with the physician as surgeon, from which, therefore, we are justified in concluding that the name for the physician, *asû*, especially "healer," was originally applied to the surgeon. Since the code is conspicuous for the absence of regulations for the priesthood,[2] the surgeon is to be regarded as a layman and not as a priest.[3] Whether the same holds good for Egypt, where anatomy and surgery arise naturally in connection with the elaborate method of embalming the dead, is, I am told by Egyptologists, a question that cannot be definitely answered, though the indications are that while, as in Babylonia and Assyria, the treatment of disease was always retained in the hands of the priests and never entirely dissociated from the cult,

[1] See R. F. Harper's edition of "The Hammurabi Code" (Chicago, 1906), pp. 76–81.

[2] There are, to be sure, numerous regulations for the devotee, or "woman of the god," attached to the service of the temple, but she occupies a different plane from that of the priest.

[3] By a play upon the name *asû*, of which the Babylonians and Assyrians were so fond, the two parts of the word *a* and *su* were interpreted as "father (or "son") of knowledge." That the *asû* was, however, originally a priest is shown by the fact that the two signs with which the word is written are set down as a synonym of *bârû*, literally the "seer" or "inspector," *i. e.*, of the sacrificial animal, which is one of the commonest terms for the "priest" as diviner

such treatment could also be undertaken by laymen, and that surgery was entirely independent of religious rites, except, of course, in the case of circumcision, which as a distinctly religious act could only be performed by a priest.[1]

[1] On circumcision and other forms of surgery among the Egyptians, see Prof. W. Max Muller, Egyptological Researches (Washington, 1906), pp. 60–62; On Egyptian Medicine, the "Harveian Oration" of Richard Caton (London, 1904); Reisner, the Hearst Medical Papyrus (University of California, 1905), Introduction, p. 4, and Erman, Life in Ancient Egypt, pp. 356–360 seq.

APPENDIX.

ANNUAL REPORT OF THE LIBRARY COMMITTEE FOR 1907.

The number of volumes in the Library is	75,616
General Library	58,694
Lewis Library	13,454
S. D. Gross Library	3,251
Obstetrical Society Library	217
There are also:	
Unbound "Reports" and "Transactions"	8,807
Unbound "Theses" and "Dissertations"	21,733
Unbound Pamphlets	62,300

Not included in the above total there are 1707 duplicates, which will be disposed of as rapidly as possible; and included in the total are 2038 duplicates retained as "reserves" to replace the more frequently used books and journals as they are worn out.

There have been received during the year 3344 volumes, 17,138 pamphlets, and 28,109 numbers of medical periodicals; 630 of the added volumes were new publications, and 40 of these were written or edited by Fellows of the College.

The Library receives by purchase, in exchange, or as gifts from the editors or publishers, 592 periodical publications—170 American and 422 foreign. Thirty new subscriptions were added during the year.

	American.	Foreign.
Henrietta Rush Fales Baker Fund	0	26
William T. Carter Fund	0	16
John D. Griscom Fund	4	36
S. D. Gross Library Account	0	3

	American.	Foreign.
William F. Jenks Fund	2	31
Journal Association	1	12
Oliver A. Judson Fund	0	5
William W. Keen Fund	3	15
Library Endowment Fund	4	124
Weir Mitchell Fund	1	32
Philadelphia Medical Society Fund	0	4
Lewis Rodman Fund	0	11
John F. Weightman Fund	0	4
Caspar Wistar Fund	4	13
By Purchase	2	16
In Exchange	81	63
Editors	60	11
Publishers	8	0

In addition, we receive current numbers of 148 American and 92 foreign medical, pharmaceutical, and dental periodicals; in most cases the exchanges of the following journals, sent to the Library at stated intervals, through the courtesy of the editors:

American Journal of the Medical Sciences.
Medical Council.
Monthly Cyclopedia of Practical Medicine.
Therapeutic Gazette.
University of Pennsylvania Medical Bulletin.

We exchange publications with the following schools of medicine:

University of Berlin.	University of Halle.
" Bern.	" Heidelberg.
" Bonn.	" Kiel.
" Breslau.	" Königsberg.
" Erlangen.	" Leipzig.
" Geissen.	" Marburg.
" Göttingen.	" Rostock.
" Griefswald.	" Strasburg.
Faculty of Medicine of Nancy.	
"	" Rio de Janeiro.
"	" Toulouse.

Eight hundred and ninety inaugural dissertations have been received during the year.

Thirty-seven newly published books were presented by the following authors or editors:

Dr. H. S. Anders.
Dr. J. J. Black.
Dr. C. G. Coakley.
Dr. G. P. Conn.
Dr. J. C. Da Costa, Jr.
Dr. W. Ewart.
Dr. J. A. Freeman.
Dr. H. Friedenwald.
Dr. C. P. Grayson.
Dr. H. A. Hare.
Dr. C. J. Jackson.
Dr. Edward Jackson (editor).
Dr. A. V. Meigs.
Dr. S. Weir Mitchell.
Dr. J. B. Murphy.
Dr. William Osler.
Dr. Isaac Ott.
Dr. W. A. Pusey.
Dr. L. B. Rabinovitch.
Dr. A. M. Ramsay.
Dr. Beverley Robinson.
Dr. Ronald Ross.
Dr. G. E. de Schweinitz (editor).
Dr. P. Stewart.
Dr. J. J. Walsh.
Dr. H. E. Wetherill.

Twenty volumes were sent by the publishers at the request of the following authors or editors:

Dr. J. M. Anders.
Dr. M. S. Cohen.
Dr. W. A. N. Dorland (editor).
Dr. A. P. Francine.
Dr. E. P. Gleason.
Dr. J. P. Crozer Griffith.
Dr. H. A. Hare (editor).
Dr. J. C. Heisler.
Dr. Edward Jackson.
Dr. Howard A. Kelly.
Dr. H. R. M. Landis (editor).
Dr. W. T. Longcope (editor).
Dr. E. E. Montgomery.
Dr. Charles P. Noble.
Dr. Walter L. Pyle.
Dr. H. W. Stelwagon.

The following are donors of 25 volumes or more:

Dr. T. V. Crandall	36	volumes.
Dr. Charles W. Dulles	135	"
Dr. A. G. Ellis	27	"
Dr. Hobart A. Hare	91	"
Dr. William Moss	49	"
Dr. Francis R. Packard	149	"
Dr. M. P. Ravenel	37	"
Dr. James Tyson	51	"
Dr. De Forest Willard	40	"
Dr. Horatio C. Wood	910	"

From the publishing houses of:

American Medicine Publishing Co.	12 volumes.
P. Blakiston's Son & Company	34 "
F. A. Davis Company	12 "
Lea Brothers & Company	3 "
J. B. Lippincott Company	13 "
W. B Saunders Company	29 "
William Wood & Company	3 "

The Library is especially indebted for large gifts of pamphlets and unbound numbers of journals to the following persons:

Dr. Lewis H. Adler, Jr.
Dr. Astley P. C. Ashhurst.
Dr. S. Solis Cohen.
Dr. W. A. N. Dorland.
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Dr. A. A. Eshner.
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Dr. David Riesman.
Dr. G. E. de Schweinitz.
Dr. J. Alison Scott.
Dr. J. M. Swan.
Dr. J. J. Taylor.
Dr. C. F. Taylor.
Dr. William Thomson.
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Dr. De Forest Willard.
Dr. C. S. Witherstine.
Dr. A. C. Wood.
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J. B. Lippincott Company.
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Powers, Weightman, Rosengarten Co.
W. B. Saunders Company.
William R. Warner & Company.
John Wyeth & Brother.

The following is the account of books purchased by the "Funds":

	Volumes purchased.	Cost.	Volumes bound.	Cost.
Henrietta Rush Fales Baker Fund	71	$173.15	29	$21.55
Luther S. Bent Fund	32	48.33	12	7.40
William T. Carter Fund	46	191.26	27	22.30
John D. Griscom Fund	84	235.07	32	24.00
William F. Jenks Fund	84	257.51	16	14.75
Oliver A. Judson Fund	11	45.14	3	1.90
William V. & John M. Keating Fd	9	18.48	5	3.10
William W. Keen Fund	79	241.02	41	31.65
Library Endowment Fund	165	674.35	2	1.35
Weir Mitchell Fund	49	298.10	..	..
Philadelphia Med. Soc. Fund	5	12.30	..	..
Lewis Rodman Fund	63	245.94	26	27.00
John F. Weightman Fund	15	45.39	12	9.15
Caspar Wistar Fund	25	165.30	12	11.65
Total	738	$2651.34	217	$175.80

Special Accounts:

Fund for completing journals	173	$320.90		
Journal Association	22	146.60		
New Book Fund	35	72.84		
J. Ewing Mears' Account	17	86.41	8	$9.25
S. D. Gross Library Account	26	136.13	16	18.65
Total	273	$762.88	24	$27.90

George B. Wood Fund:
For Library supplies, stationery, etc. $324.89

There have been 7058 visits to the Library recorded; of these, 3049 were made by Fellows of the College; 20,048 volumes have been consulted in the Library, besides books taken from the shelves by Fellows of the College, of which no record can be kept; 4562 volumes have been taken out; 1312 works and 1008 volumes have been catalogued, and 3598 cards have been written.

All accessions of books and the more important pamphlets have been catalogued; the books accessioned and shelf-listed; 18,895 pamphlets have been examined, and 6182 retained and classified; 8510 volumes of the Lewis Library have been re-accessioned.

Revision of Catalogue:

Number of cards revised, typewritten, examined, and indexed for the year ending November 1, 1907 18,220

1141 volumes have been bound.

We have received during the year $224.36 from the sale of duplicates, and there is a credit to our exchange account with the New York Medical Book Company of $192.74. The amount of fines collected is $45.50.

In the spring the College granted permission to the Library Committee to occupy the meeting-room on the first floor, and in August wooden stacks were erected there at a cost of $151.68, met by cash on hand in the Book Stack Fund. By moving 30,000 volumes, the librarian has been able to gain room, which may be sufficient for a year or two, for the more congested classes of books. With the great temporary relief granted by the use of this room, and the cheering hope of plenty of space in the near future, your Committee is glad to be able, this year, to spare the Fellows the usual jeremiade about the distressing want of shelf-room to store the books.

The resignation of the librarian's first assistant, the chief cataloguer, and the assistant cataloguer has somewhat retarded the work, but their places have been filled by others who seem likely to be efficient after a little experience, and all goes well with the Library.

The accompanying balance sheet of the Treasurer shows the receipts and expenditures.

The current expenses of the Library, aside from the purchase of books, for the coming year are estimated at $5155.43.

GEORGE C. HARLAN,
Chairman.

ABSTRACT OF THE REPORT OF THE COMMITTEE ON MÜTTER MUSEUM, 1907.

During the past year the average number of contributions to, and specimens deposited in, the Mütter Museum has been made. Several wet specimens of tumors have been rejected owing to the richness of the museum in this class of specimens, but it must not be inferred from this, however, that members should hesitate in sending all wet specimens to the curator for his judgment as to whether they should be placed upon the shelves, as it is the desire of the Committee to have as complete a collection as possible without unnecessary duplication.

Dr. William J. Taylor presented an unusual specimen of vesical calculus, and Dr. W. W. Keen added to his usual gifts a specimen of intracapsular fracture of the humerus, and another showing a most interesting charring of the frontal bones of a child in which the child subsequently recovered.

Dr. Arthur Van Harlingen presented several casts showing syphilitic degeneration of the teeth, of which the Museum had no samples, and Dr. J. M. Miller added two well-executed wax preparations from life of clubbing of the fingers and toes in chronic pulmonary disease.

A unique collection of the shoes from many races from all parts of the globe, comprising about one hundred specimens, was deposited by Dr. H. Augustus Wilson. This collection has been placed in a separate case and would be of interest to members engaged in orthopedic work, and for teaching purposes.

The Committee would gladly receive specimens from the various hospitals, and is ready to provide proper receptacles and preserving fluids to the curators of the hospital pathological museums, so that duplicate specimens may be preserved until that time in which they may be transferred to the museum, and which will be done immediately upon notification to the curator. It is recognized that at the hospitals many specimens valuable for teaching purposes are allowed to be destroyed, owing to lack of facilities for their preservation, or space wherein they may be stored.

It is the aim of the Committee as far as possible to advance the work of the Museum as a practical institution for teaching, in which instructors from the various schools may take their classes, confident in finding the particular collection of gross specimens which it is their object to demonstrate.

Pathological museums are at present scattered among the several hospitals and institutions, and it is recognized how much more advantageous it would be if there were a central collection to which teachers from any of the schools might bring their classes.

The Mütter Museum today contains a collection showing diseases of the bones which in this country is almost unrivalled, and which can be added to but little. This fact has been emphasized by the number of students who annually avail themselves of the opportunity to examine these remarkable specimens. Fellows of the College, and others upon proper introduction, will be extended every facility for the use of specimens upon notification to the Committee.

Dr. Edward Reynolds, of Boston, has recently availed himself of the collection of normal and deformed pelves, and on leaving wrote to the Curator: "I have studied long, and go away much impressed."

It is hoped that the Fellows of this College, by their constant and thoughtful support, will aid the efforts of the Committee in fulfilling the aim of the far-seeing founder of the Museum.

All of which is respectfully submitted.

George McClellan,
Chairman.

LIST OF PAPERS: SECTION ON OPHTHALMOLOGY.

December, 1906.

The Treatment of Glaucoma Simplex (Iridectomy, Sympathectomy, and Myotics), by Dr. Frederick Cheney of Boston (by invitation).

January, 1907.

Exhibition of a Case of Spontaneous Gangrene (Malignant Edema) of the Eyelids, by Dr. George C. Harlan.

Exhibition of a Case of Chronic Ophthalmoplegia Externa, by Dr. Wm. Campbell Posey.

Exhibition of a Case Showing Associated Movements of Lids and Jaw, by Dr. Wm. Campbell Posey.

Exhibition of a Case of Chronic Ophthalmoplegia, by Dr. Wm. Zentmayer.

Report of a Case of Unusually Extensive Involvement of the Cranial Nerves in Tabes, by Dr. Wm. Zentmayer.

An Anatomical Study of Three Cases of Sympathetic Ophthalmia (Uveïtis Proliferativa, Fuchs), by Dr. E. V. L. Brown, of Chicago (by invitation).

Exhibition of a Case of Extensive Incised Wound of the Sclera, by Dr. John T. Carpenter.

A Note on Increased Intra-ocular Tension, Caused by Subconjunctival Injections, by Dr. G. E. de Schweinitz.

February, 1907.

A Case of Electric-light Burn of the Eye, with Transient Blindness, by Dr. Burton Chance.

Report of a Case of Epithelioma of the Sclerocorneal Limbus, by Dr. George S. Crampton.

Trachoma, Clinically and Socially Considered, by Dr. H. F. Hansell.

Report of a Case of Keratitis Tuberculosa Treated by Tuberculin, with exhibition of the patient, by Dr. S. Lewis Ziegler.

Exhibition of a Case of Coloboma of the Eyelid, with Curious Reduplication of the Bulbar Conjunctiva, by Dr. Wm. Campbell Posey.

Exhibition of a Case of Removal of the Lens for High Myopia, by Dr. Wm. Campbell Posey.

Exhibition of a Case of Double Pterygium, with Cyst Formation in the Head of Each Growth, by Dr. Edward A. Shumway.

Exhibition of a Case of Localized Edema and Elevation of the Retina from the Blow of a Snowball, by Dr. Edward A. Shumway.

March, 1907.

Exhibition of a Case of Amaurotic Family Idiocy, by Dr. Mary Buchanan (by invitation).

Report of a Case of Acute Superior and Inferior Polioencephalitis, by Dr. John B. Turner.

Report of Two Fatal Cases of Orbital Cellulitis, by Dr. Howard F. Hansell.

A Case of Embolism of a Cilioretinal Artery, by Dr. Frederick Krauss.

Exhibition of a Case of Persistent Hyaloid Artery, by Dr. Frederick Krauss.

Concerning Keratitis Disciformis, with a Case, by Dr. G. E. de Schweinitz.

Traumatic Iridocyclitis and Localized Edema of the Macula, with Microscopic Slides, by Dr. G. E. de Schweinitz and C. M. Hosmer (by invitation).

April, 1907.

Exhibition of a Case of Bitemporal Hemianopsia in an Apparently Healthy Person, by Dr. Wm. Campbell Posey.

Exhibition of a Case of Cerebral Syphilis, showing Old Left Optic Atrophy and Palsy of all the Ocular Muscles of the Left Eye except the Inferior Rectus, with Choked Disk in the Right Eye, by Dr. Wm. Campbell Posey.

Exhibition of a Case of Palsy of the Right Inferior Rectus Muscle in an Hysterical Subject, with La Grippe and Syphilis as Possible Causal Factors, by Dr. Wm. Campbell Posey.

The Refractive Changes Dependent upon Glycosuria, by Dr. George M. Gould.

Paralysis of Upward Associated Ocular Movements (Blicklähmung), by Dr. Wm. G. Spiller.

Exhibition of a Case of Keratitis Disciformis, by Dr. Wm. Zentmayer.

Exhibition of a Case of Epithelioma of the Lid Successfully Treated by the Local Application of Chlorate of Potash, by Dr. Wm. Zentmayer.

October, 1907.

A Case of Unilateral Nystagmus, Benefited by Treatment, by Dr. C. A. Veasey.

The Visible Remains of the Vitreous Canal, with a Report of Three Cases, by Dr. Burton Chance.

Exhibition of a Case of Keratitis Punctata Superficialis, by Dr. Wm. Zentmayer.

The Significance of Unilateral Mydriasis, by Dr. Howard F. Hansell.

Exhibition of a Case of Vernal Conjunctivitis Showing Unusual Corneal Conditions, by Dr. Wm. Campbell Posey.

November, 1907.

Exhibition of a Case of Argyrosis Due to the Use of Argyrol, by Dr. Frederick Krauss.

Exhibition of a Case of Keratitis Profunda in a Child, by Dr. Frederick Krauss.

The Ocular Symptoms of Chronic Polycythemia, by Dr. G. E. de Schweinitz.

Double Perforation of the Eyeball by Metallic Foreign Bodies, with Report of a Case, by Dr. Edward A. Shumway.

A Case of Rhythmical Alterations in the Width of the Palpebral Fissure of Both Eyes, Probably Produced by Spasm of the Levator Palpebræ Muscles, by Dr. C. A. Veasey.

A Supplemental Report of a Case of Simple Glaucoma in the Young, by Dr. C. A Veasey.

Observations on the Motais Operation for Ptosis, with Report of Three Cases, by Dr. Wm. F. Shoemaker.

Exhibition of a Case of Ptosis Operated upon by the Hunt-Tansley Method, by Dr. Wm. Campbell Posey.

Exhibition of a Case of Ptosis Operated upon by the Hunt-Tansley Method, by Dr. Wm. M. Sweet.

A Comparison Between Hysterical and Simulated Blindness, by Dr. Howard F. Hansell.

Exhibition of a Case Operated upon for Correction of Cicatricial Ectropion, by Dr. Wm. Campbell Posey.

Exhibition of a Case of Syphilitic Perivasculitis and Optic Atrophy, by Drs. Wm. Campbell Posey and Frederick Krauss.

Exhibition of Two Cases of Oculomotor Palsy in Cerebrospinal Syphilis, by Drs. Wm. Campbell Posey and Frederick Krauss.

Edward A. Shumway,
Clerk.

LIST OF PAPERS: SECTION ON OTOLOGY AND LARYNGOLOGY.

December 19, 1906.

Dr. Woodbury: "The Opsonic Index and its Relation to Angina."

Dr. Randall: "(1) A Case of Cholesteatoma and Lateral Sinus Thrombosis with Evacuation and Jugular Ligation. (2) Rapid Cure under Blood Clot Mastoid Dressing. (3) Note on Dionin per Tubem in Chronic Catarrhal Deafness."

Dr. Potts: "Ligation of the Jugular Vein in Septic Thrombosis."

January 16, 1907.

Dr. Vansant: "Exhibition of (1) Large Papillomatous Growth on the Dorsum of the Tongue. (2) Growth Involving the Lateral Wall of the Larynx."

Dr. Stout: "Report on Four Intracranial Abscesses Secondary to Middle-ear Suppuration."

Dr. Gibb: "Notes on Papillomata of the Larynx."

February 20, 1907.

Dr. Smith: "Exhibition of a Case of Temporosphenoidal Abscess."

Dr. Wood: "Report on Two Cases of Sarcoma of the Tonsil."

Dr. Stout: "Exhibition of Specimen of Endotracheal Carcinoma."

Dr. Watson: "Remarks on Acute Phlegmonous Infections of the Throat."

March 20, 1907.

Dr. Harland: "Exhibition of a Case of Pemphigus of the Pharynx."

Dr. Butler: "Demonstration of Some Preparations of the Normal Anatomy and Histology of the Ear."

Dr. Harland: "The Larynx in Locomotor Ataxia."

Dr. Randall: "(1) Remarks on Regeneration of the Mastoid after Exenteration, as Shown at Operation Four Years Later. (2) Case of Labyrinthine Caries in Chronic Tympanic Suppuration."

Dr. Gibb: "Some Complications and Sequelæ of Operations on Pharyngeal and Faucial Tonsils."

April 17, 1907.

Dr. Vansant: "Exhibition of a Case of Paraffin Injection of the Nose."

Dr. Randall: "Slide Preparations of Tuberculous Mastoiditis."

Dr. Bliss: "(1) Exhibition of Foreign Body of Unusual Character Removed from the Nose. (2) Foreign Body Removed from the Larynx."

Dr. Potts: "Report of a Case of Septic Meningo-encephalitis or Cerebritis."

May 15, 1907.

Dr. Marshall: "Exhibition of a Postoperative Case of Sarcoma of the Tonsil in a Child of Six years, with Tumor and Slides."

Dr. Gleason: "Treatment of Faucial and Pharyngeal Tonsillar Diseases."

October 16, 1907.

Dr. Makuen; "The Palate as a Factor in the Development of Speech."

Dr. Randall: "Report of a Case of Exostosis of the Auditory Canal, largely Cartilaginous."

Dr. Wood: "Report of an Unusual Complication following the Radical Mastoid Operation."

Dr. Packard: "Report of a Case of Erysipelas following a Mastoid Operation in Typhoid Fever."

November 20, 1907.

The following programme was given by invitation of the Executive Committee:

Dr. Chevalier Jackson, of Pittsburgh, gave a "Demonstration of the Bronchoscope in the Removal of Foreign Bodies from the Upper Air Passages." The subject was discussed by Dr. George McClellan on the Anatomical Relations; Dr. John H. Gibbon and Dr. W. L. Rodman from a Surgical Standpoint; Dr. James C. Wilson and Dr. James Tyson from a Medical Standpoint; Dr. Wm. M. L. Coplin on the Pathology of the Parts; Dr. George E. Pfahler on the Application of the *x*-rays.

B. H. Potts,
Clerk.

LIST OF PAPERS: SECTION ON GENERAL MEDICINE.

December, 1906.

Exhibition of a Patient with "Probable Congenital Disease of the Heart," by Dr. Joseph Sailer.

Preicteric Itching, by Dr. David Riesman.

The Development of Cardiac Murmurs during Attacks of Biliary Colic, by Dr. David Riesman.

Further Observations on Metabolism in Purpura, by Dr. David L. Edsall.

A Review of the Therapeutic Use of Tuberculin, by Dr. A. P. Francine.

The Pathogenesis and Treatment of Neurasthenia, by Dr. Robert N. Willson.

January, 1907.

Chronic Intestinal Auto-intoxication, by Dr. F. Forcheimer (by invitation), of Cincinnati.

The Clinical Manifestations and Treatment of Intestinal Auto-intoxication, by Dr. H. A. Hare.

The Significance of the Urinary Findings in Intestinal Auto-intoxication, by Dr. David L. Edsall.

Inhibition and Augmentation of Digestive Ferments as Influencing Intestinal Auto-intoxication, by Dr. Joseph Sailer.

The Significance of the Fecal Findings in Intestinal Auto-intoxication, by Dr. J. Dutton Steele.

February, 1907.

Exhibition of a Patient with Streptothricosis Pulmonum Resembling Phthisis, and Terminating in Apparent Recovery, by Dr. S. Solis Cohen.

Exhibition of a Patient with a Large Aneurysm of the Thoracic Aorta Treated by Wiring, by Dr. James M. Anders.

Report of a Case of Multiple Aneurysm of the Thoracic Aorta, by Dr. A. A. Eshner.

Report of a Case of Pulsating Empyema, and Three Cases of Pulsating Pyopneumothorax, by Dr. William B. Stanton.

A Study of the Autopsy Findings in Twenty-five Cases of Miliary Tuberculosis, by Dr. H. R. M. Landis.

A Study of the Findings in the Cerebrospinal Fluid in Tuberculous Meningitis, by Dr. G. Canby Robinson (by invitation).

March, 1907.

Exhibition of a Patient having Amyotrophic Lateral Sclerosis, with a Bulbar Onset, by Dr. Alfred Gordon.

Exhibition of a Case of Polydactylism, by Dr. A. A. Eshner.

Tuberculosis in Orphan Children, by Dr. W. Taylor Cummins (by invitation).

The Coagulation Time of Blood in Diseases, by Dr. S. Solis Cohen.

A Preliminary Note on the Opsonic Index in Diabetes Mellitus, by Dr. J. C. Da Costa, Jr.

Exhibition of the Jaequet Cardiosphygmograph with Remarks on its Utility in the Clinical Study of the Venous Pulse, by Dr. George William Norris.

April, 1907.

Cases Illustrating Symptoms Referable to Mediastinal Pressure, by Dr. J. C. Da Costa, Jr.

The Relative Value of the Commercial Varieties of Pepsin, with some Remarks on the Dosage of Pepsin, by Drs. Joseph Sailer and C. B. Farr.

Albuminuria in Pulmonary Tuberculosis, by Dr. C. M. Montgomery (by invitation).

Uncinariasis, a Report of a Case, with Clinical and Pathological Findings, by Dr. Thomas G. Ashton.

Report of Two Cases of Endarteritis of the Larger Vessels, Gangrene and Death, by Dr. J. N. Henry.

October, 1907.

A Method of Recording Physical Signs, by Dr. C. B. Farr.

November, 1907.

Observations on the Venous Pulse, by Dr. George A. Piersol (by invitation).

The Proportion of Hydrochloric Acid to Pepsin in the Gastric Secretion, by Dr. Joseph Sailer.

The Nervous Manifestations of Arteriosclerosis, by Dr. Alfred Stengel.

The Clinical Significance of Fecal Bacteria, with Especial Reference to intestinal Antisepsis, by Dr. J. Dutton Steele.

GEORGE W. NORRIS,
Clerk.

LIST OF PAPERS: SECTION ON GYNECOLOGY.

January 16, 1907.

Dr. B. M. Anspach: "Pathological Changes Caused by the Gonococcus."

Dr. E. P. Davis: "Relation of the Gonococcus to Pregnancy."

Dr. H. A. Kelly, of Baltimore: "Protection of the Innocent."

Dr. G. E. Shoemaker: "Restoration of Function in the Innocent."

Dr. H. H. Boldt, of New York (by invitation): "Shall the Operative Treatment of Gonorrheal Salpingo-oöphoritis be Conservative or Radical?"

March 21, 1907.

"Symposium of the Abdominal Wound."

Dr. C. P. Noble: "The Abdominal Wound—Its Immediate and After Care."

Dr. F. F. Simpson, of Pittsburg (by invitation): "Gastro-intestinal Complications following Abdominal Operations."

Dr. G. Brown Miller, of Washington (by invitation): "Cardiac and Vascular Complications following Abdominal Operations."

Dr. Stephen E. Tracy (by invitation): "Renal Complications following Abdominal Operations."

May 16, 1907.

Mr. Max Brödel, Art Instructor in Anatomy in the Johns Hopkins University (by invitation): "Anatomical Questions Involved in Nephroptosis." Fully illustrated by lantern-slides from original drawings and special dissections.

Dr. B. C. Hirst: "The Relation of Enteroptosis to Pelvic Diseases."

Dr. H. D. Beyea: "Shortening of the Gastric Ligaments in Ptosis of the Stomach."

Discussion by Drs. Joseph Sailer, H. K. Pancoast, and J. G. Clark. Dr. Pancoast will discuss this question from the standpoint of diagnosis by means of the *x*-rays, illustrating by *x*-ray negatives.

Wm. R. Nicholson,
Clerk.

LIST OF PAPERS: SECTION ON MEDICAL HISTORY

November, 1907.

Dr. Lewis S. Pilcher, of Brooklyn: "A Surgeon to the Pope: A Study of the Chirurgia of John de Vigo and an Estimate of his Position in the History of Surgery."

Dr. Roland G. Curtin: "A Study of Some Medical Bookplates," with lantern-slide illustrations.

Dr. William Pepper: "Benjamin Franklin as a Physician, Judged from His Life and Writings.

WILLIAM PEPPER,
Clerk.

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